# Safety Maintenance and Production

EST. 1901 AMERICA'S PIONEER MAGAZINE IN ITS FIELD

FIFTY CENTS OCTOBER, 1954

# To get a greater return for your eye safety dollar...

As a natural result of the continued efforts of Safety Directors to reduce eye accidents, more and more workers are wearing industrial safety prescription glasses on the job.

In a growing number of instances, however, arrangements have not been made to take full advantage of the complete services of the professions to verify the lens properties of these glasses, fit the glasses to the worker and maintain them in proper adjustment.

As a consequence, safety standards have been jeopardized in some areas, through the use of flammable non-safety frames, — or lenses of questionable impact resistance. Tragic, unnecessary, and costly accidents have resulted.

American Optical Company believes that corrective-protective glasses should reach the employees only when adequate professional services are provided. Such a procedure is a sure and effective way to combat the breakdown in safety standards. In some states, this procedure is required by law.

Corrective-protective glasses made by American Optical Company meet all safety requirements. Super Armorplate lenses carry this mark (AO) indicating that they are heat-strengthened and comply with rigid specifications for thickness and impact resistance. Frames are made of corrosive-resistant metal or non-flammable plastic and are sturdy enough to withstand use under normal working conditions. They also carry the AO trademark.

The employment of the full cycle of professional services in connection with prescription safety glasses and the standardization of AO lenses and frames will assure maximum protection for the worker and the greatest return for every dollar invested under your supervision in visual safety.

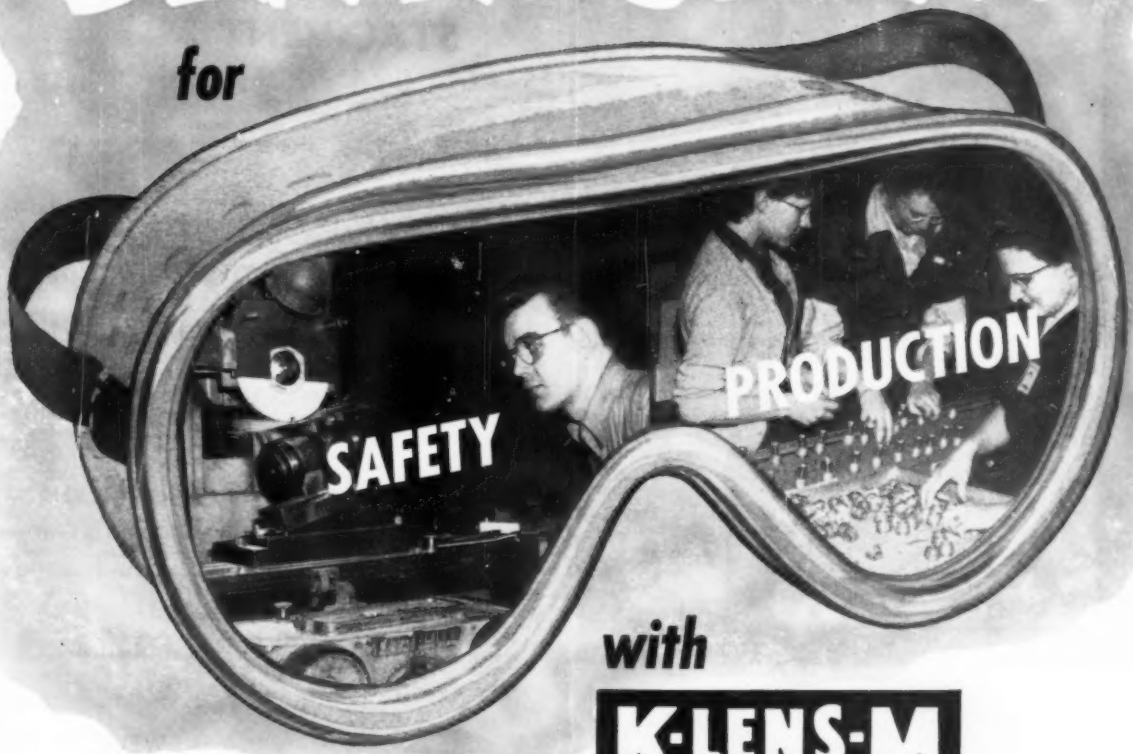
Be sure to see our film, Room 524A, Conrad Hilton, at the National Safety Show.

Keep your workers in the Safety Zone with American Optical Safety Equipment.

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

(For details, use Key # X-1 on card on page 99)

# Sure you're sure of—
# BETTER SEEING
## for




## with
## K-LENS-M
REG U.S. PAT OFF.

***The Acknowledged Leader in the Lens Cleaning Field***

The K-LENS-M Lens Cleaning and Anti-Fogging Station encourages your employees to practice eye-safety. This compact, efficient, and economical goggle cleaning unit contains the K-LENS-M Lens Cleaning Liquid; K-LENS-M Lint-free lens tissues with sanitary disposal space for used tissues; and K-LENS-M Anti-Fogging Attachment.

***Send for FREE sample of K-LENS-M liquids on your company letterhead.***

**K-LENS-M** Liquid Lens Cleaner cleans both *glass and plastic* safety goggles and shields quickly and easily . . . with no filming or scratching. A drop of K-LENS-M Anti-Fogging Liquid keeps them free of fog for the entire workday. Factory workers prefer K-LENS-M for eye-safety equipment because it removes dirt, fog, smears. Endorsed by safety engineers and used by leading companies throughout the world.

THE **WILKINS** CO., INC. Cortland 2, N. Y.

**For demonstration, visit Booth 58, National Safety Congress, October 18–22, Chicago**

**(For details, use Key # X-2 on card on page 99)**

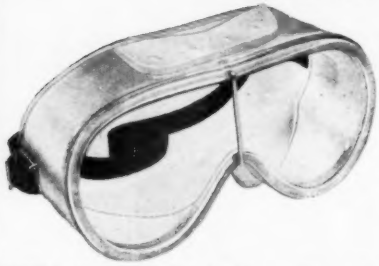

Published by Alfred M. Best Company, Inc., Publication Office, Columbia Turnpike, Box 232, Rensselaer, N. Y. Editorial and General Offices, Best Building, 75 Fulton St., New York 38, N. Y. Entered as Second Class Matter at Post Office at Rensselaer, N. Y. Under Act of March 3, 1879. Subscription rates, $4.00 Per Year in the United States; $5.00 in Canada; Foreign, $5.00. Single Copies, 50 cents. Publication Date 1st.

# YOU GET COMFORT PLUS *BETTER EYE PROTECTION*

WATCHEMOKET STAC-VENT eye SAVERS

A New Principle in Goggle Ventilation gives *Greater Safety—Clearer Vision*. No liquid, chemical or other hazard can reach the eye. "Stac-Vent" provides draft ventilation at the top and center of the goggle (where warm, moist air normally accumulates).

## STAC-VENT



**Model 440SV**

For heavy impact, supplied with .125" thick, optically perfect methacrylate lens.

**Model 441SV**

For medium and light impact. Supplied with .060" thick, optically perfect acetate.

### SOFT VINYL FRAME — Fits Over Largest Prescription Glasses

Extra-soft plastic frame with soft nose flange form-fits snugly, yet comfortably, around facial contour . . . closes the gaps around nose and cheeks. Also available with regular, screen or no ventilation.

### EXTRA WIDE REPLACEABLE LENS

The optically perfect, shatterproof lens provides full protection against impact. Lens is extra wide for picture-window vision. Improved metal lock bar holds lens tightly in frame. Frame acts as bumper to prevent scratching lens when laid face down.

LENS COLORS: Clear and light, medium or dark green.
FRAME COLORS: Clear, transparent green or opaque black.

**Model 442**

### Soft Vinyl Frame 50 MM Round Hardened Safety Glass Lenses

Maximum protection where there is extreme abrasion. Maximum comfort and minimum weight. Large size, fits over all prescription glasses.

**Model 492**

### WELDING GOGGLE OPAQUE BLACK SOFT VINYL FRAME

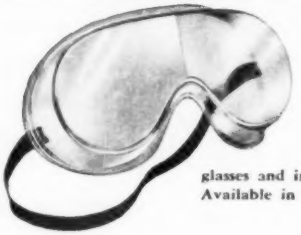
Furnished with replaceable 50 mm round, Federal Specification, filter lens shades 3, 4, 5 or 6, protected inside and out by cover lenses.

**Model 99**

### CHEEPEE

Low cost one piece acetate. Close fitting, lightweight, comfortable. Optically correct . . . no distortion. Available in clear or medium green.

Model D-Lux



### FITS OVER MOST GLASSES

The acetate lens surface is optically perfect thanks to a special process which protects the lens during forming. This one piece D-Lux acetate goggle is large enough to fit over most glasses and is close fitting for maximum protection and comfort. Available in clear and medium green.

*For details, see your Authorized Eye Savers Supplier or write direct.*

***Quality Eye Protective Equipment*** ***Made by the Leaders in Plastics***

## WATCHEMOKET OPTICAL CO., INC.

238 West Exchange St., PROVIDENCE 3, R. I. *In Canada: Levitt-Safety Limited, Toronto 10, Montreal 26*

(For details, use Key # X-4 on card on page 99)

# QUALITY AT LOWER COST
# *WITH THE EYE SAVERS LINE!*

**Model 415** **TUC - AWAY**

**For Lightweight Comfort**

### 90% PROTECTION THAT'S WORN 100% OF THE TIME

Tuc-Away featherlight design is easy to wear . . . comfortable and attractive. Shatterproof, optically perfect, methacrylate lenses provide safe protection.

**VISOR - TUC** **Model 422**

**New Over-eyes Protection**

### ALMOST 100% PROTECTION THAT'S WORN 100% OF THE TIME

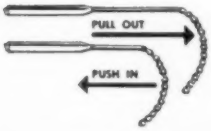
Almost 100% protection, plus all the comfort of "Tuc-Away." "Visor-Tuc" fits snugly against the forehead to provide over-eyes protection from glare and flying particles.

### SNAP-IN, SNAP-OUT LENSES

All "Tuc" lenses are optically perfect. They can be replaced by the wearer . . . just snap them in or out . . . they are always firmly locked in place.

### SHATTERPROOF, SEMI-CUP EYE SAVERS LENSES

prevent entry of particles from side and bottom. Lenses are interchangeable in "Tuc-Away" and "Visor-Tuc" models. Lenses are available with regular side shield, long (1") side shield or semi—or full—cup, in clear and light, medium or dark green.




### Adjustable "Retrax" Temples

Temples are adjusted by the wearer himself for complete comfort . . . no tools or skill required . . . "Tucs" fit any face.

### Low Initial Cost — Low Maintenance

A minimum inventory is possible because either frame style, "Visor-Tuc" or "Tuc-Away," fits all workers thanks to "Universal" Nose-piece and "Retrax" Temples. All adjustments are made by the wearer.

### SPLIT JOINT **Model 80**

Split Joint Plastic Frame makes changing lenses a simple operation, no heating to distort frame. Retrax temple easily adjusted—one size, Standard 47 mm drop eye lenses.

Quick, easy replacement of:
Plastic Safety Lenses
Prescription Lenses
Plano Safety Glass Lenses

**Model 55**

**"Methaspec" Eye Shield**

### "CLIP-ON" SIDE SHIELDS

Add deep cup side protection to Model 80 and practically any other Safety Spectacle. Easy to attach and remove. Molded of clear or green acetate. Nickel-silver clip holders.

### LOW COST VISITORS' GOGGLES

Optically correct, one piece, curved Methacrylate Eye Savers Lens provides heavy impact protection. Lens is .080" thick, available in clear or light, medium and dark green.

***Quality Eye Protective Equipment*** ***Made by the Leaders in Plastics***

## WATCHEMOKET OPTICAL CO., INC.

238 West Exchange St., PROVIDENCE 3, R. I. *In Canada: Levitt-Safety Limited, Toronto 10, Montreal 26*

(For details, use Key # X-3 on card on page 99)

# Safety's Supermarket

## Directory of Exhibitors at the 42nd Safety Congress

*The Exposition will be held at the Conrad Hilton Hotel, Chicago, October 18 to 22. Exhibits will be in four areas: North and South Exhibition Halls (enter from Lower Lobby), Second and Third floors.*

| | Booth Number |
|---|---|
| Acme Protection Equipment Co. | 71 |
| Admatic Corp. | 235 |
| Advance Glove Mfg. Co. | 213 |
| Aetna Casualty & Surety Co. | 102–103–104 |
| Alan Wood Steel Co. | 119 |
| American Abrasive Metals Co. | 114 |
| American Allsafe Co., Inc. | 189 |
| American Chain & Cable Co., Inc. | 2–3–4 |
| American-LaFrance & Foamite Corp. | 116–117 |
| American Optical Co. | 78–79–80–81 |
| Ampco Metal, Inc. | 10 |
| Ansul Chemical Co. | 92–93 |
| Arcadia Mfg. Co. | 42 |
| Armory Street Safety Shoes | 310 |
| Award Incentives | 202 |
| Ayerst Laboratories | 304 |
| Bashlin, W. M., Co. | 5–6 |
| Bausch & Lomb Optical Co. | 51–52–53 |
| Beryllium Corp. | 182 |
| BEST, ALFRED M., CO. | 38 |
| Bethlehem Steel Co. | 177 |
| Better Light Better Sight Bureau | 215 |
| Bil-Jax, Inc. | 194 |
| Bone-Dry Shoe Mfg. Co. | 155 |
| Bradley Washfountain Co. | 32–33 |
| Brady, W. H., Co. | 26 |
| Breck, John H., Inc. | 153 |
| Bristol-Myers Products | 211 |
| Browne, Stewart R., Mfg. Co., Inc. | 151–152 |
| Brulin & Co. | 301 |
| Buhrke, R. H., Co. | 110–111 |
| Bullard, E. D., Co. | 127–128 |
| Cambridge Rubber Co. | 19 |
| Chance, A. B., Co. | 1 |
| Charleston Rubber Co. | 175 |
| Chemical Specialties | 206 |
| Chicago Eye Shield Co. | 72–73–74 |
| Coca-Cola Co. | 305–306–307 |
| Columbus Glove Mfg. Co. | 146–147 |
| Columbus McKinnon Chain Co. | 68–69 |
| C-O-Two Fire Equipment Co. | 14 |
| Cunningham, M. E., Co. | 46 |
| Davis Emergency Equipment Co. | 75–76 |
| Detex Watchclock Co. | 164 |
| Diversey Corp. | 112–113 |
| Dockson Corp. | 142 |
| Dow-Corning Corp. | 126 |
| Dunn Products | 23 |
| Du Pont, E. I. de Nemours & Co., Inc. | 185–186 |
| E. & J. Mfg. Co. | 168 |
| Eagle-Picher Sales Co. | 43 |
| Edmont Mfg. Co. | 25 |
| Elliott Service Co. | 24 |
| Embosograf Corp. of America | 222 |
| Emerson, J. H., Co. | 49 |
| Fairfield Glove Co. | 156 |
| Fendall Co. | 44 |
| Fine Organics, Inc. | 231 |
| Fireye Corp. | 219 |
| Frank Mfg. Co. | 178 |
| Franklin Research Co. | 143 |
| Frommelt Industries | 188 |
| Gamewell Co. | 195 |
| General Detroit Co. | 230 |
| Globe Co. | 170 |
| Graton & Knight Co. | 221 |
| Gro-Cord Rubber Co. | 120 |
| Haws Drinking Faucet Co. | 162 |
| Hewson Co., Inc. | 179 |
| Hild Floor Machine Co., Inc. | 130 |
| Hillyard Chemical Co. | 22 |
| Holland-Racine Shoes, Inc. | 184 |
| Hygiene Research, Inc. | 196 |
| Hy-Test Safety Shoes | 95 |
| Industrial Gloves Co. | 16–17 |
| Industrial Products Co. | 192–193 |
| Institute of Industrial Launderers | 212 |
| Insto-Gas Corp. | 9 |
| Interstate Rubber Products | 205 |
| Iron Age Div., H. Childs & Co. | 50 |
| Jackson Products | 172 |
| Jomac, Inc. | 217 |
| Jones & Co. | 214 |
| Junkin Safety Appliance Co. | 136 |
| Justrite Mfg. Co. | 18 |
| Karel First Aid Supply Co. | 82 |
| Kelley-Mahorney Co. | 233 |
| Keystone View Co. | 150 |
| Kidde, Walter, & Co., Inc. | 63–64 |
| Kimball Safety Products Co. | 96 |
| Klein, Mathias & Sons | 65–66 |
| Kunz, J., Gloves | 166 |
| Legge, Walter G., Co., Inc. | 36–37 |
| Lehigh Safety Shoe Co. | 87 |
| Lightfoot Schultz, Co. | 47 |
| Littell, F. J., Machine Co. | 176 |
| Louisville Ladder Co. | 226 |
| Lowery Bros. | 169 |
| Luther Mfg. Co. | 31 |
| Maico Co., Inc. | 218 |
| Marsh & McLennan, Inc. | 134–135 |
| Martindale Electric Co. | 209 |
| Masury-Young Co. | 224–225 |
| McAn, Thom, Safety Shoes | 118 |
| McDermott, Julian A., Co. | 60 |
| McDonald, B. F., Co. | 61–62 |
| McJohn Corp. | 311 |
| Medford Mfg. Co. | 309 |
| Medical Supply Co. | 137–138 |
| Melflex Products | 210 |
| Metal Arts Co., Inc. | 165 |
| Metropolitan Life Insurance | 139 |
| Micro Switch | 174 |
| Milburn Co. | 59 |
| Miller Equipment Co., Inc. | 144–145 |
| Mine Safety Appliances Co. | 83–84–85–86 |
| National Mine Service Co. | 229 |
| National Safety Council—Lower Lobby | |
| National Society for the Prevention of Blindness | 302 |
| Newman Mfg. & Sales Co. | 187 |
| Nichols Engr. Co. | 163 |
| Occupational Hazards | 54 |
| Oil-Dri Corp. of America | 148–149 |
| Onox, Inc. | 40 |
| Osborn Mfg. Corp. | 220 |
| Pac-Kit Co. | 39 |
| Packwood, G. H., Mfg. Co. | 94 |
| Patent Scaffolding Co., Inc. | 98–99 |
| Pennsylvania Optical Co. | 125 |
| Permamix Corp. | 198 |
| Petersen Engr. Co. | 232 |
| Pioneer Rubber Co. | 227 |
| Porto-Clinic Instruments Co. | 204 |
| Positive Safety Mfg. Co. | 41 |
| Powder Actuated Tool Mfg. Institute | 181 |
| Prairie State Products | 208 |
| Protectoseal Co. | 105–106 |
| Pulmosan Safety Equipment Co. | 20 |
| Pyrene Mfg. Co. | 15 |
| Racine Glove Co. | 197 |
| Radiator Specialty | 190 |
| Randolph Laboratories, Inc. | 132–133 |
| Reece Wooden Sole Shoes, Co. | 115 |
| Robbins Instrument | 203 |
| Rockwood Sprinkler Co. | 7 |
| Roebling's, John A., Co. | 191 |
| Rose Mfg. Co. | 45 |
| Safety Box Toe Co. | 161 |
| Safety Clothing & Equipment Co. | 55–56 |
| Safety First Products Co. | 223 |
| Safety First Shoe Co. | 57 |
| SAFETY MAINTENANCE & PRODUCTION | 38 |
| Safety Tower Ladder Co. | 183 |
| Salisbury, W. H. | 90–91 |
| Sani-Mist, Inc. | 121 |
| Sawyer, H. M. | 28 |
| Schrader's, A. Sons | 12–13 |
| Scientific Industrial Supply Co. | 303 |
| Scott Aviation Corp. | 21 |
| Sellstrom Mfg. Co. | 30 |
| Standard Safety Equipment Co. | 34–35 |
| Steel Scaffolding Co. | 97 |
| Stepan Chemical Co. | 29 |
| Stephenson Corp. | 207 |
| Stonehouse Signs, Inc. | 129 |
| Stop-Fire, Inc. | 167 |
| Surety Rubber Co. | 67 |
| Surty Mfg. Co., Inc. | 131 |
| Swivelier Co. | 228 |
| Taylor, S. G., Chain, Co. | 8 |
| Timmins Splint Co. | 180 |
| Trinal, Inc. | 154 |
| U-C Lite Mfg. Co. | 308 |
| Union Wire Rope Co. | 11 |
| U. S. Safety Service Co. | 100–101 |
| Wagner Sign Service, Inc. | 234 |
| Wash-Rite Co. | 171 |
| Watchemoket Optical Co. | 140–141 |
| Welsh Mfg. Co. | 124 |
| West Disinfecting Co. | 88–89 |
| Wheeler Protective Apparel Co. | 77 |
| Wilkins Co., Inc. | 58 |
| Williams Jewelry & Mfg. Co. | 48 |
| Willson Products, Inc. | 107–108–109 |
| Winko-Matic Signal | 173 |
| Wolverine Shoe & Tanning | 201 |
| Woodbridge Ornamental Iron Co. | 216 |
| Wyandotte Chemicals Corp. | 70 |
| Waverly Petroleum Prod. Co. | 122–123 |

# ONLY ONE PAIR TO A CUSTOMER

## THE EYES OF YOUR WORKMEN ARE YOUR MOST PRECIOUS TOOLS

## *SAFEGUARD THEM BETTER — AND SAVE MONEY TOO*

**1** American industry's swing to MAGIC LENS TISSUE (Silicone treated) is one of the greatest success stories of the Safety field. Each sheet is over 50% larger than usual, and has twice the tearing strength. Yet MAGIC costs you less. $8.40 per Carton (6 refills per carton). The compact Dispenser is only $2.50.

**2** And here is the MAGIC HEAVY-DUTY Cleaning Station for heavy-grit areas or where ANTI-FOG protection is necessary—on plastic or any eyewear.

Modern science's finest cleaning and anti-fogging fluid. Pressure-packed. About 1,400 applications per can. Each 12-oz can contains twice as much as old-fashioned 6-oz. bottles, and pressure packing makes it go twice as far. So, 1 MAGIC CAN EQUALS 4 SUCH BOTTLES. That is the first saving.

No pump. Nothing to refill and priced at only $12.50 per carton of twelve 12-oz. cans.

Indestructible steel Dispenser locks can in place. No pilferage possible. This superior cabinet costs only $5.95. Releases each sheet only 1-by-1, not in bunches, and enormously reduces waste.

The paper, not silicone-treated, is a superb, super-strong, wet-strength tissue. Naturally, no scratching on plastics, and no lint. Instead of a few sheets in little boxes, Heavy Duty carton contains 18 giant refills (each refill has 760 jumbo-size interfolded sheets 8" x 4¾") at only $11.60 per carton.

Ask to exchange MAGIC for your old cleaning stations FREE, or order anew—*now!*

**FREE BOOKLET.** The informative story of sight and eye safety is told in our Booklet "ONLY ONE PAIR TO A CUSTOMER." Safety men tell us they find it invaluable. Write for this booklet today.

MAGIC IS A TRADE-MARK OF THE SILICONE PAPER COMPANY OF AMERICA, INC.

**Magic — BOTH BEST FOR YOU**

T. M. REG. U. S. PAT. OFF.

**The Silicone Paper Company Of America, Inc.**
**General Offices: 75 E. 45th St., N. Y. 17, N. Y.**

(For details, use Key # X-5 on card on page 99)

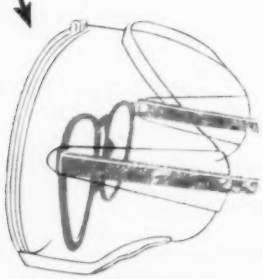
# IMPROVED No. 90A Series
# WILLSON MonoGoggle

## Wider, Deeper Frame Gives Greater Clearance Over Spectacles

We've taken the popular Willson MonoGoggle® design and made it with a deeper and wider pliable, transparent *vinyl* frame with grooves molded into the sides for extra roominess over glasses. It provides protection against light impact hazards on such operations as spot welding, buffing, wood working and chemical handling.

Workers who wear prescription glasses—even the new, big plastic frames—will welcome its extra roominess. Transparent frame is tinted light green to keep out glare, but admits adequate side light. Clear or green plastic lenses are securely held in place by a deep channel and closed "tab pocket".

Ask your Willson distributor to show you the new No. 90A Series MonoGoggles, available with either direct or indirect ventilated frames or non-ventilated styles. Or write for bulletin.



Side view shows molded-in grooves in sides of frame provide ample clearance for spectacle temples — removes interference with eye glass comfort.

More than 300 Safety Products Carry This Famous Trademark

**WILLSON®**

*Established 1870*

**WILLSON PRODUCTS, INC., 207 Washington St., Reading, Pa.**

(For details, use Key # X-6 on card on page 99)

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Alfred M. Best Company, Inc.
75 Fulton St., New York 38, N. Y.

Annual Subscription $4 (two years $6)
Canadian & foreign $5 (two years $8)
Single issues 50c. Also quantity rates

# SAFETY MAINTENANCE & PRODUCTION

**FORMERLY "SAFETY ENGINEERING"**
**EST. 1901**

**VOL. 108, NO. 4** **OCTOBER, 1954**

EDITORIAL

The Safety Specialist ... 9
National Safety Congress ... 9

ACCIDENT PREVENTION

What Have the Plant Engineer & the Safety Engineer in Common by A. B. PETTIT 21
A Second Look at Welding Hazards ... by PAUL C. ZIEMKE 22
Molten Metal Miracle ... 25
A Non-Skid Floor Wax ... by CARL LAMM 28
Making Grinding Wheels Behave (machine guarding series) by C. E. HARPER 44
What You Must Know to Guard a Machine—Part 2 by W. E. MONTGOMERY 48
Keeping Up With Emergency Lighting ... 83
New Safety Products ... 94
Free Safety Bulletins ... 99

MAINTENANCE

A New Floor Wax ... by CARL LAMM 28
Western Maintenance Show ... 30
Keeping Up With Emergency Lighting ... 83
New Maintenance Products ... 94
Free Maintenance Bulletins ... 99

INDUSTRIAL HYGIENE

Clean Water for "Gandy Dancers" ... 35
Industrial Hygiene News ... 65
The Need for Proper Wound Care of the Injured Hand (first aid series) by DR. RAYMOND M. CURTIS 66
Industrial Hygiene Data Sheet—Trichloroethylene ... 69
The Coffee Break—Boost or Bust? ... 71
The Industrial Nurse ... 73
New Hygiene Products ... 94
Free Hygiene Bulletins ... 99

FIRE PROTECTION

A Second Look at Welding Hazards ... by PAUL C. ZIEMKE 22
The Fire Front ... 55
Fires Mean Inspection Failures (fire protection series) ... by ALAN L. KLING 56
Clean Up Dry Cleaning & Degreasing Fires ... by NORMAN H. DAVIS, Jr. 60
New Fire Products ... 94
Free Fire Bulletins ... 99

SPECIAL DEPARTMENTS

Safety's Supermarket (Exhibitors at National Safety Congress) ... 4
Check List of Aids to Production ... 12
The Future Shows ... 14
Inside the Trade ... 16
The Safety Shelf ... 32
A Safety Illustration ... 41
Learning the Hard Way ... 76
What's the Law ... 77
Safety Achievements ... 79
Transportation Safety ... 88
Safety on Film ... 90
What's New in the Safety-Maintenance Field ... 94
Free Bulletins & Catalogs ... 99
Reader's Free Inquiry Card ... 99
Index to Advertisers ... 100

COVER PICTURE
By courtesy of Humble Oil & Refining Co.

AMERICA'S PIONEER MAGAZINE IN ITS FIELD

SAFETY MAINTENANCE & PRODUCTION is indexed regularly by Engineering Index, Inc., New York

# NOW YOU CAN RENEW BUSY FLOORS Overnight

with Hillyard **Quick Dry Industrial Finishes Built to Take Production Loads**

**The Hillyard TREATMENT for WOOD**

- Dries in 2 hours—avoids delay in work schedules.
- Keeps floors light for better light diffusion.
- Slip-Resistant for Safety underfoot.
- Extremely high abrasion resistance —assures longer service without expensive refinishing.
- Increased coverage—costs you less in material and labor time.

**The Hillyard TREATMENT for CEMENT**

- Eliminates acid etching of new or old floors.
- Permits proper adhesion of finish coat for long lasting protection against dusting of cement areas.
- Traffic or worn spots can be quickly touched up.
- Reduces maintenance—to fast daily dust-up.

**In SURFCOAT and CEM-SEAL,** Hillyard has combined quick-dry properties with heavy-duty protection that allows fast and lasting finishing or refinishing of plant-wide floors. Vital areas may be opened to traffic in only a few hours, avoiding tie-up in work schedules. These products, backed with the knowledge of 50 years experience represent a real advance in industrial floor care. Because quick-dry finishes to date often sacrifice heavy-duty properties, these new products, giving you *combined* advantages, find wide acceptance in industry.

**CLEAN** Heavy-Soiled Areas with Hillyard RENOVATOR.

**MAINTAIN** Floors the Flame-Proof Way with HIL-SWEEP—leaves floors clean and dust-free with no harmful effect on your surface finish. Fire-tests prove Hil-Sweep will not burn.

**WRITE for a demonstration!** Your nearby Hillyard Maintaineer is prepared to show you how Hillyard products researched for industrial floors will solve floor treatment and maintenance problems in your plant.

FLOOR HILLYARD TREATMENTS

*"On Your Staff— Not Your Payroll"*

**ST. JOSEPH, MO.**
San Jose, Calif. • Passaic, N. J.

(For details, use Key # X-7 on card on page 99)

# It's Safe to Say

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## ★ THE SAFETY SPECIALIST

THERE seems to be an aura of glamour surrounding the title of engineer and to a certain extent it is justified. Often that title represents hard work, sacrifice and countless gallons of midnight oil consumed before achieving the coveted degree.

Perhaps, this helps to explain the rather widespread tendency on the part of many safety directors to call themselves safety engineers in the hope that personal prestige may be enhanced.

Snobbery in one's professional life should be rooted out as quickly as social snobbery. Certainly, a degree in engineering is a prize to be not lightly regarded. However, many of the best safety directors are not professional engineers but they are eminently qualified to do the job for which they were chosen.

Elsewhere in this issue appears the views of a well-known industrial health and safety supervisor of a chemical plant in Baltimore, who emphasizes the importance of closer collaboration between the plant engineer and the safety specialist.

Author A. B. Pettit makes the point that Webster's dictionary defines engineering as the science of "maneuvering and contriving" and that therefore the safety man worth his salt must do a lot of both!

The fact remains that this does not make him a professional engineer. While the safety leader must know something about engineering, he also should have a tight grasp upon processing, material handling, economics, medicine, law and certainly psychology if he is to succeed. He must know human relations, and as Mr. Pettit reminds us, have a missionary's zeal to do the utmost for his fellowmen. Perhaps, therefore, it would be more accurate to describe our progressive safety man as "accident prevention specialist."

Since the safety specialist frequently is a consultant on human relations, it behooves management to surround him with the utmost cooperation of all concerned from the president down. The best interests of the plant are served when economic loss and human suffering are reduced. It is here that the plant engineer working in close collaboration with the safety director can bring about ultimate results in preventing costly and often tragic accidents.

Just as we always will have a minority of mediocrities in the medical and legal professions who would contribute more to human progress driving a truck, so can a small segment of men boasting an engineering degree do better work removed from the all-encompassing safety field.

On the other hand, spectacular results in human welfare and loss prevention have been achieved by safety directors who should not be termed safety engineers.

It is fortunate that the level-headed American is not title-crazy but instead, knows that a rose by any other name would be just as fragrant.

Author Pettit is to be commended for his emphasis upon personal and official qualifications for the enviable job of safety director. In the last analysis, the use of "engineer" in itself will never make a true leader in accident prevention and, more than ever before, the accident prevention movement needs leaders of varied qualifications.

## ★ NATIONAL SAFETY CONGRESS

ONCE again it is time to herald the opening of the National Safety Congress and Exposition. Sponsored by the National Safety Council, the year's outstanding event in safety will be opened in Chicago for the week beginning October 18th.

Safety leaders from all parts of the free world will gather to exchange views and opinions with their colleagues in their noble and dedicated attempt to save human suffering and prevent unnecessary economic loss.

Certainly no more worthy endeavor can be envisaged, especially in this day when slaughter is second nature to nations determined to force their will ruthlessly upon countless millions.

The week's greatest single feature will be the Exposition—a display of the most modern devices, products and equipment designed to stem the tide of accidents.

Progressive management will do well to send representatives of their executive, operating and supervisory staffs to the world's greatest single convention devoted to the conservation of life and property.

Subject sessions appealing to every accident prevention interest will be a highlight but our prediction is that the Exposition will be the star of the show. Certainly, it will be worthy of repeated and prolonged visits.

H. A.

# just a few of the new

# you'll

## Come see many more!

**NATIONAL SAFETY CONGRESS, CHICAGO**

**LEHIGH**
**SAFETY SHOE COMPANY**
**EMMAUS, PA.**

**NEW! WINTER-PAC**—No more frozen feet from working in icy-slush or mud! This 12" pac is built with a thick, wool-fleece *interlining* up to the ankle seam, to keep cold out, body heat in.

**NEW! CUSHIONED-INNER MOCCASIN**—a handsome new moccasin oxford in today's popular lighter tan—with the foam-cushioned innersole that helps to reduce job-fatigue. Non-marking, oil-resistant sole and heel. As smart for leisure wear as it is safe on the job.

**NEW! RESISTS CHEMICALS**—Many common chemicals "eat" ordinary shoe leather and rubber. This shoe resists chemical dust, fumes and splatters that make others rot and crumble.

# safety shoe ideas find at Booth 87

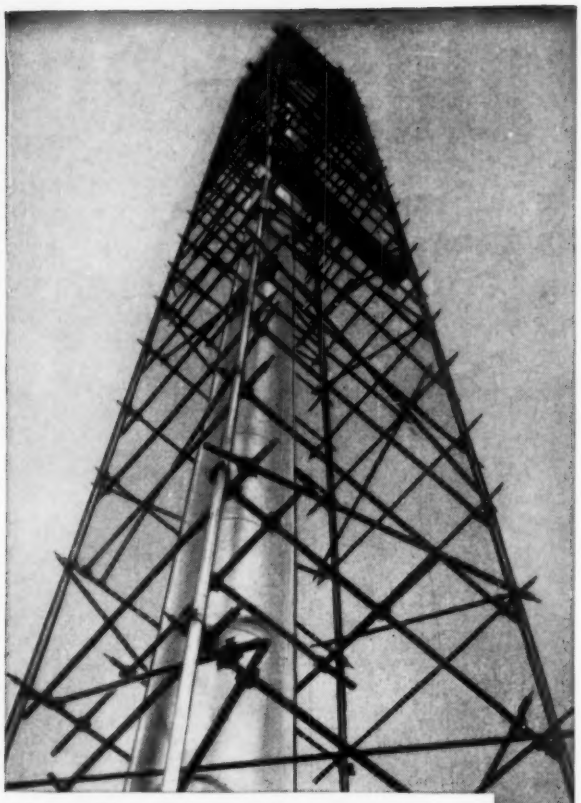
**NEW! FOR WOMEN IN WHITE**—an especially attractive and comfortable oxford in smooth white leather, with smart white Neolite crepe wedgie sole (NO heel to catch on steps and ledges). Your women employees will wear it for bowling and sportswear, too!

**NEW! THERMAliner**—the entire upper is padded with a layer of foamed vinyl, sandwiched in leather, that effectively insulates the foot against foundry heat or sub-zero cold. Insulation will not absorb moisture, perspiration, oil or odors. Also in 8-inch boot shoe style.

**NEW! EASY OUT** when hot stuff splatters! Top quality foundry boot with mahogany eskimo calf upper—new high-heat resistant neoprene composition sole and heel—dacron-stitched throughout. Designed to give long, safe wear under gruelling hot-mill conditions.

**NEW! GUIDE STEP**—black calf U-Wing style built over the amazing new Lehigh last that is Contour-Measured to fit better at 19 points instead of the usual 4! Designed expressly for the man who "can't wear" safety shoes, but more comfortable for most feet.

(For details, use Key # X-8 on card on page 99)



# How To Keep Costs Down . . . When Maintenance Goes "Overhead"

**When labor goes off the ground, costs and risks go up too!**

Patent Scaffolding will save you time and money in all phases of off-the-ground maintenance — painting and cleaning; electrical work, machinery maintenance and many other jobs! Yes, and increase safety at the same time! . . . PS has exactly the *right* scaffolding to fit the job — *and the only complete scaffolding service!* It's worth remembering.

**WRITE NOW FOR**
FREE GUIDE to selection of the right equipment for any off-the-ground job. Just ask for Bulletin G205.

EAGLE METAL LADDERS SCAFFOLDING

*For Greater Safety... Efficiency... Economy*

**THE PATENT SCAFFOLDING CO. INC.**

38-21 12th Street, Dept. SM&P, Long Island City 1, New York
*West Coast Plant:* 6931 Stanford Ave., Los Angeles, Cal. Offices in Principal Cities
**(For details, use Key # X-9 on card on page 99)**

## Check List of Aids to Production:

### Through Safety—


Safety Personnel Cooperation ..... 21
Use of Welding Equipment ..... 22
Safety Goggles ..... 25
Non-skid Floor Wax ..... 28
Colored Grinding Wheels ..... 44
Machine Guards ..... 48
Emergency Light ..... 83
Flashlight Bulb ..... 83
Industrial Flashlights ..... 83
Battery Charger ..... 84
Explosion Proof Floodlight ..... 84
Glass Jar Battery Light ..... 84
Emergency Generators ..... 85
Long Life Emergency Light ..... 85
Electric Lanterns ..... 85
Ladder Stabilizer ..... 94
Oil Resistant Sole ..... 95
Modulated Light Relay ..... 95
Safety Loading Ramp ..... 95
Mercury Decontaminator ..... 95
Colored Hard Hats ..... 95
Zipper Leg Overalls ..... 96
Neoprene Glove ..... 96
Punch Press Guard ..... 96
New Traffic Marker ..... 96
Safety Switch Key Holder ..... 97
Snake Bite Kit ..... 97
Linemen's Blanket Clamp ..... 97
Safety Multiple Lockout ..... 98
Self Sticking Warning Stripes ..... 98
Free Safety Bulletins ..... 99


### Through Maintenance—


New Floor Wax ..... 28
Emergency Light ..... 83
Flashlight Bulb ..... 83
Industrial Flashlights ..... 83
Battery Charger ..... 84
Explosion Proof Floodlight ..... 84
Glass Jar Battery Light ..... 84
Emergency Generators ..... 85
Long Life Emergency Light ..... 85
Electric Lanterns ..... 85
Appliance Truck ..... 94
Anti-fog Lens Cleaner ..... 94
Ladder Stabilizer ..... 94
Toilet Bowl Cleaner ..... 95
Mercury Decontaminator ..... 95
Goggle Sanitizer ..... 96
Sewage Deodorant ..... 97
Maintenance Truck ..... 97
Paint Roller Coaters ..... 98
Free Maintenance Bulletins ..... 99


### Through Industrial Hygiene—


Clean Water Dispenser ..... 35
Antiseptic Wound Care ..... 66
Automatic Coffee Dispenser ..... 71
Toilet Bowl Cleaner ..... 95
Mercury Decontaminator ..... 95
Goggle Sanitizer ..... 96
Sewage Deodorant ..... 97
Snake Bite Kit ..... 97
Electric Hand Dryer ..... 97
Free Hygiene Bulletins ..... 99


### Through Fire Prevention—


Use of Welding Equipment ..... 22
Fire Hazard Inspections ..... 56
Cleaning & Degreasing Fire Control ..... 60
Stored Pressure Extinguisher ..... 94
Emergency Power Fire Fighting Unit ..... 97
Flame Resistant Clothing ..... 98
Free Fire Protection Bulletins ..... 99

**Before using ZORBALL,** Academy Plating had to scrape tallow, grease and abrasive from their polishing-room floor. Even steam cleaning failed to budge deposits.

**After using ZORBALL,** Academy Plating once again has *clean, safe* floors. No scraping is required. All that's needed is to spread and sweep up ZORBALL daily.

# ZORBALL ends floor scraping at Academy Plating Co.

"PREVIOUS to the use of ZORBALL on our polishing-room floor, we used scrapers to remove the buffing compounds consisting of tallow, grease and abrasive which had accumulated," reports Herbert Mancini, superintendent, Academy Plating Company, Newark, N.J.

"We also tried a steam-cleaning machine using an alkaline detergent, but it failed to remove these deposits. However, three weeks after applying ZORBALL, the unsightly and dangerous condition was cleaned up by the traction of the polishing operators' shoes on the floor. No labor was required except the daily spreading and removal of the ZORBALL!"

Removing compound deposits is just one of the big benefits you get from ZORBALL — the safest, lowest use-cost floor absorbent known. It absorbs oil, water, paint, chemicals, yet remains skidproof and nonflammable — even after hard use, or when saturated. Dried out, ZORBALL can be re-used without mudding, caking or dusting. Ask your Wyandotte representative or jobber for a sample or demonstration, today! *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California.*

**Wyandotte CHEMICALS**

*Helpful service representatives in 138 cities in the United States and Canada*

**Largest manufacturers of specialized cleaning products for business and industry**

(For details, use Key # X-10 on card on page 99)

**NO SCUFF,**

**NO BUFF,**

**NO SLIP**

*announcing*

# LEGSURE

the low-cost polish that protects floors 3 ways

Now your floors can *gleam* without buffing; take abuse without scuffing!

New LEGSURE is a scuff-resistant Safety Polish that dries to a lustrous, hard finish. No time wasted in buffing. Dirt and water repellent, LEGSURE gives even greater slip-resistance than is required by Underwriters' Laboratories. And the finish won't be "walked off". The shine lasts. The protection endures. You'll save up to 50% on labor and materials. And you'll reduce slip-accidents by up to 98%.

Available only through the LEGGE Company and its authorized representatives. Write today for full information.

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101 Park Ave.,
New York 17, N.Y.
Branch offices in
principal cities
*In Toronto—*
*J. W. Turner Co.*

(For details, use Key # X-11 on card, page 99)

# THE Future SHOWS

**Chicago, Ill.** *Oct. 18–22*

Forty-Second Annual National Safety Congress and Exposition (Conrad Hilton Hotel). R. L. Forney, General Secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

**Atlantic City, N. J.** *Nov. 7–11*

Industrial Housekeeping Safety Guild (Eastern Sanitary Supply Group) Trade Show and Convention (Hotel Ambassador). William F. Plowfield, Executive Director, 4 S. 15th St., Philadelphia 2, Pa.

**Portland, Oregon** *Nov. 18–19*

Governor's Sixth Annual Industrial Safety Conference (Masonic Temple). Leonard A. Weston, Director, Accident Prevention Division, State Industrial Accident Commission, Public Service Bldg., Salem, Oregon.

**Spartanburg, S. C.** *Nov. 18–19*

Seventeenth Annual South Carolina Accident Prevention Conference (Spartanburg Memorial Auditorium and Wofford College). J. D. Watson, Jr., Safety Director, South Carolina Industrial Commission, Columbia, S. C.

**Chicago, Ill.** *Jan. 24–27*

Sixth National Plant Maintenance and Engineering Show (International Amphitheatre). Clapp & Poliak, Inc., Show Management, 341 Madison Ave., New York 17, N. Y.

**E. Lansing, Mich.** *Feb. 14–17*

Fourth Annual Industrial Ventilation Conference (Michigan State College). James C. Barrett, Michigan Department of Health, Division of Occupational Health, Old Dewitt Road, Lansing 4, Mich.

**New Orleans, La.** *Feb. 27–Mar. 1*

Southern Safety Conference and Exposition (Jung Hotel). W. L. Groth, Executive Director, P. O. Box 8927, Richmond, Va.

**Philadelphia, Pa.** *March 8–9*

Twenty-first Annual Philadelphia Regional Safety and Fire Conference and Exhibit (Broadwood Hotel). Walter W. Matthews, Managing Director, Philadelphia Safety Council, 17th & Sansom Streets, Philadelphia 3, Pa.

**Pittsburgh, Pa.** *March 29–31*

Thirtieth Annual Western Pennsylvania Safety Engineering Conference & Exhibit (Hotel William Penn). H. H. Brainerd, exec. manager, 605 Park Bldg., Pittsburgh 22, Pa.

**Indianapolis, Ind.** *March 30–31*

Eighth Central Indiana Safety Conference & Exhibit (Claypool Hotel). Indianapolis Safety Council, 320 N. Meridian St., Indianapolis, Ind.

**New York, N. Y.** *April 11–15*

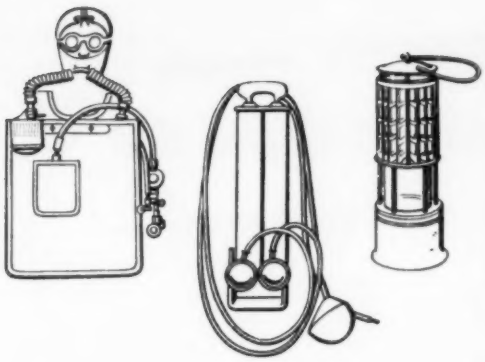
Twenty-fifth Annual Greater New York Safety & Exposition (Hotel Statler). Harold C. Mesch, general chairman, Greater New York Safety Council, Inc., 60 E. 42nd St., New York 17, N. Y.

**Cleveland, Ohio** *April 26–28*

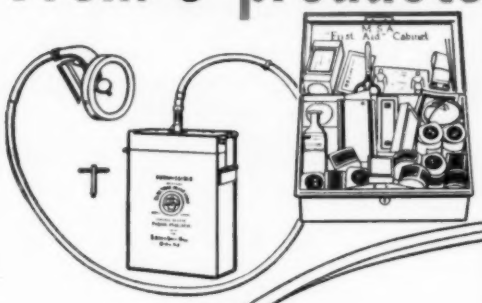
Twenty-fifth Annual All Ohio Safety Congress & Exhibit (Hotels Cleveland and Hollenden). A. W. Moon, Congress Manager, Industrial Commission of Ohio, Safety & Hygiene Div., Columbus 15, Ohio.

**Grand Rapids, Mich.** *April 26–28*

Twenty-fifth Annual Michigan Safety Conference (Pantlind Hotel and Civic Auditorium). R. H. Goring, Executive Secretary, Michigan Bell Telephone Co., Detroit, Mich.



# From 5 products to more than 3600 . . .



## A 40 Year Record of SERVICE TO SAFETY

Keeping pace with safety needs has been our job here at M.S.A. since our beginning on June 14th, 1914. During these years, hundreds of new hazards have been introduced by new industrial processes and projects. Many of these problems were anticipated by us . . . many were relayed to us. The more than 3600 items now in our product line provide ample testimony to the fact that our extensive research and manufacturing facilities were successful in finding the right answers.

Our finest reward for these 40 years of safety service comes from the knowledge that today thousands of men, who otherwise could be seriously injured, are well because M.S.A. products have turned accidents into incidents. This knowledge is a spur to continuing achievement.

SERVING SAFETY 40 YEARS 1914 • 1954

MSA SAFETY EQUIPMENT HEADQUARTERS

*Call the M.S.A. man on your every safety problem . . . his job is to help you*

**MINE SAFETY APPLIANCES COMPANY**

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At Your Service: 76 Branch Offices in the United States

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Representatives in Principal Cities in Mexico, Central and South America
Cable Address: "MINSAF" Pittsburgh



(For details, use Key # X-12 on card on page 99)

**To help YOU... reduce absenteeism!**

...accidents and labor turnover. And increase safety, sales and loyalty—a custom designed Safety Award program.

Safe conduct reduces accidents, which in turn gives you more manpower, less lost time. These, in turn, reduce your insurance rates.

Safety emblems, designed for your particular use or program, become a symbol of cooperative 'thanks' through public recognition of your employees' capabilities and loyalty.

Establish a Safety Awards program today. Our free brochure will give you all of the necessary information, and our representative will call to help clarify details. There is no charge for this service or of the service of our expert design department who will create an awards emblem that will immediately identify your product and symbol.

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**(For details, use Key # X-13 on card, page 99)**

*Appointment of Stuart Edgerly as manager of the newly-formed industrial sales division is announced by Fenwal Incorporated, Ashland, Mass. In his new capacity Mr. Edgerly will administer the sales of industrial temperature controls through the company's sales organization throughout the country.*

---

*Walter E. Sutter has been appointed manager of sales for instruments and industrial electronic products of the Commercial Equipment Department of the General Electric Company, Electronics Park, Syracuse, New York.*

*In his new position, Sutter will be responsible for the national sales of General Electric electronic instruments such as laboratory power supplies, frequency meters, beta-gamma survey meters; and industrial electronic equipment such as industrial (closed circuit) television and factory automation.*

---

*Nicholas M. Molnar, head of Molnar Laboratories and president of Fine Organics, Inc., manufacturing chemists, has been elected president of the Cooper Union Alumni Association. A graduate of the Cooper Union School of Engineering in 1926, Mr. Molnar holds a number of patents in the field of organic chemistry. He is a member and past president of the Association of Consulting Chemists and Chemical Engineers, a fellow of the American Institute of Chemists, and a member of the American Chemical Society, New York Academy of Sciences, Chemists' Club, American Public Health Association, and the New York Board of Trade.*

---

*The appointment of Paul Schultz to a general staff position with responsibility for carrying on standardization work in engineering and control procedures is announced by Clark Equipment Company. Mr. Schultz has been with the company for 20 years, with experience in both the Industrial Truck Division and the Automotive Division.*

*Announcement is also made of the appointment of L. A. DePolis as general sales manager of the Industrial Truck Division of Clark Equipment Company. Mr. DePolis was formerly sales manager for Ross Carrier Company, recently acquired by Clark.*

---

*Dayton, Price and Company, Ltd. have been appointed Export Managers for Bobrick Dispensers, Inc. The Ambard Division will handle the complete Bobrick line of soap dispensers in all export markets, with the exception of Canada, where it is handled by Wyant and Company, Ltd.*

---

*Hannifin Corp., manufacturers of air-controlled power press guards, has moved its offices and production facilities to a newly completed plant at 501 South Wolf Road, Des Plaines, Ill.*

---

*Pittsburgh Plate Glass Company has announced plans to construct a huge, ultra-modern plate glass producing plant at Cumberland, Maryland. According to Harry B. Higgins, president, construction of the new plant will mark the first time in over 30 years that an entirely new and complete plate glass plant has been built at a new location, containing all the facilities necessary for the production, handling and shipment of plate glass.*

---

*Edward G. Grant has been named national accounts manager for maintenance products for Johnson's Wax and Raymond W. Schimming has been made New York district manager of the same division, according to an announcement of R. W. Carlson, marketing vice president of the company.*

*Grant, who will make his headquarters in the wax firm's Racine office, has been with the company for 17 years. He has held sales positions in the company's Pittsburgh and New York districts and was New York district manager of maintenance products prior to his recent appointment. Schimming, who succeeds Grant, joined the company in 1941. He has held various sales positions and before this promotion was industrial products sales supervisor in Cleveland.*

---

*Micro Switch of Freeport, Ill., a division of Minneapolis-Honeywell Regulator Company, has changed its sales divisional set-up from 4 to 2—Eastern and Western—with a sales manager in charge of each.*

*Emmett N. Hughes, former West Coast division manager, will be western sales manager in charge of all sales operations on the West Coast, including the Rocky Mountain states. He will be headquartered in Los Angeles. John K. Lincoln will be Eastern sales manager, in charge of sales operations in all states east of the Rocky Mountains. He will headquarter in Freeport. Anderson Wacaser, former Central Division manager, will be transferred to the home office to head up Market Research.*

*(Continued on page 18)*

THIS IS OUR NEW SAFETY SIGNBOARD
WE WILL WELCOME YOUR SAFETY SLOGAN TO USE HERE
THANKS
ILP
TO ENJOY TOMORROW, PRACTICE SAFETY TODAY
THE SAFETY SCORE
TOLEDO 125 SAFE DAYS
LIMA 345 NO ONE 181
LATONIA 171 NO TWO 35
Intriguing Newness of Constantly Changed Messages is the Answer to—
YOU HAVE TO SEE TO ENJOY TV! PROTECT YOUR SIGHT!
THE SAFETY SCORE
TOLEDO 134 SAFE DAYS
LIMA 356 NO ONE 192
LATONIA 182 NO TWO 46
SOHIO WELCOMES TEACHERS BIE DAY HAVE A SAFE VISIT!
THE SAFETY SCORE
TOLEDO 138 SAFE DAYS
LIMA 358 NO ONE 196
LATONIA 184 NO TWO 48
MORE EFFECTIVE SAFETY SELLING
WAGNER ENDURONAMEL* CHANGEABLE COPY DISPLAYS
Copy can be changed in a few seconds, and without the use of ladders.
Letters mount directly on flanges in the steel panel background.
TOES WONT SING THE BLUES - - - IF YOU KEEP THEM SNUG IN SAFETY SHOES
MANUFACTURING DEPT. SAFETY SCORE
TOLEDO 144 SAFE DAYS
LIMA 366 NO. ONE 200
LATONIA 190 NO. TWO 54
Finished in a newly developed baked enamel which is
• CHIP-PROOF
• SHOCK-PROOF
• ALKALI-RESISTANT
• SALT SPRAY-RESISTANT
THINK! A THOUGHT IN TIME HAS SAVED MANY LIVES
MANUFACTURING DEPT. SAFETY SCORE
TOLEDO 123 SAFE DAYS
LIMA 372 NO. ONE 208
LATONIA 199 NO. TWO 63
The installation illustrated is 15 feet long and was installed by Arrow Sign Service for Standard Oil at the Toledo, Ohio plant.
Act today and see how quickly you get actual results in your safety record. Use the coupon NOW to get the free catalog on Wagner Changeable Copy Displays.
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# Safer liquid transfer for MODERN INDUSTRY

Tokheim Hand Pumps . . . dependable bulwark against fire and accident from faulty liquid transfer. No spilling or splash-over to breed disaster. No dripping or over-filling, no waste. Clean, dry floors. Safer working conditions. Tokheim all-purpose pumps protect employees, deliver all the material to the job.

If your present methods involve pouring, drawing, siphoning or spigoting, you need Tokheim Hand Pumps, shortest route to safe liquid handling . . . and often, to lower insurance rates also.

***Double-Action Pumping***

Pumps take hose, spout and other interchangeable accessories. Deliver up to 20 gallons a minute operating on both forward and backward strokes. Stainless steel and Permolited components withstand years of service. Thousands in use today in industry everywhere.

***Call your dealer, your Tokheim representative, or write factory direct for literature.***

QUALITY TOKHEIM DOUBLE-ACTION HAND PUMPS

*General Products Division*

**TOKHEIM CORPORATION**

*Designers and Builders of Superior Equipment*

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***Factory Branch:* 1309 Howard Street, San Francisco 3, California**

Canadian Distributor: H. Reeder, 205 Yonge Street, Toronto, Ont.

Gasoline Pumps and Accessories • Air and Liquid Dispensers • Specially Engineered Products

**(For details, use Key # X-15 on card on page 99)**


## inside the trade

*(Continued)*

National Foam System, Inc., West Chester, Pa., specialist in fire-fighting foam and equipment, announces the appointment of Mr. L. John May as plant manager.

---

Ansul Chemical Co., Marinette, Wis., announces the appointment of Ray Campbell as sales representative for its fire equipment division in the Kansas City area, covering Western Missouri, Kansas and Nebraska.

---

Mr. Raymond Koontz, President of Diebold, Inc., announced the completion of a new warehouse for finished goods in Canton, Ohio. The building provides additional storage space for standard safes and vault doors, money chests and record systems equipment. Production schedules for contract work on bank vault equipment and hollow metal doors and frames also are planned for accumulating items in the warehouse.

---

Full line listing of Master-Vac cleaners and floor machines has been granted by Underwriters' Laboratories, Inc. to the Premier Company, St. Paul, Minnesota, manufacturers of industrial and commercial vacuum cleaning equipment.

Premier units are said to meet requirements for safety from the standpoint of wiring under load and water pick-up tests. The units are designed for maintenance and for controlling and reducing damage caused by dirt, dust and litter in factories, schools, hospitals, hotels, churches and commercial establishments.

---

Magnesium Company of America has appointed Ambrose L. Duggan to direct the company's recently instituted sales coordination program, according to Miles L. Abel, executive vice president of the East Chicago, Indiana, firm. For the past eight years, Mr. Duggan had been associated with Marsteller, Gebhardt and Reed, Inc., Chicago, the industrial advertising agency firm handling the company's advertising account. During his last two years with that agency he had been completely familiar with all phases of MAGCOA marketing activities for its dockboards, materials handling equipment and other light-metal products.

# Armortred NEOPRENE Soles and Heels

## SAFETY—SERVICE AND STYLE

### NEOPRENE COMPOSITION
*A standard of quality*

14 & 18 Iron—Blk-Brown

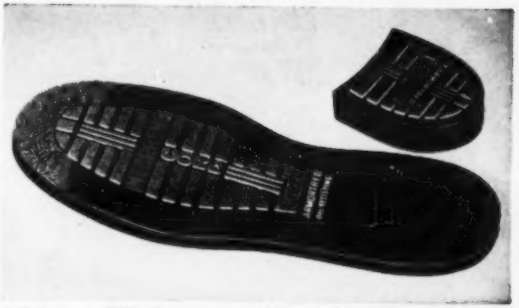
*The largest selling sole of its kind*

### NEOPRENE CORK-GRIP
*It's light—yet rugged*

15-18-21-Irons—Blk and Brown

*A soft flexible step with day-long comfort*

### NEOPRENE CORD
*It's new—it's colorful*



14 Iron—Blk-Brown—with and without Labels

*A safe-sure step and tough long wear*

By Invitation Member

Emblem of BUSINESS CHARACTER

Rice Leaders of the World Association

Represents High Standing in NAME - PRODUCT - POLICY

## ARMORTRED Soles made with DUPONT NEOPRENE

With Matching Heels

FOR—PEAK PROTECTION AGAINST HEAT, OILS, SOLVENTS ETC.

FOR—EXTRA MILES OF SAFE SERVICE

MANUFACTURED AND DISTRIBUTED BY **QUABAUG RUBBER COMPANY** NORTH BROOKFIELD, MASSACHUSETTS

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HORIZONTAL SPEEDHEATER
11 standard sizes for steam, hot water.
Capacities 17,800 to 300,500 BTUH.
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7 standard sizes. Natural, mfd. or LP gas. Capacities 25,000 to 200,000 BTUH.
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## CHECK THESE WESTINGHOUSE HORIZONTAL SPEEDHEATER SPECIALS!

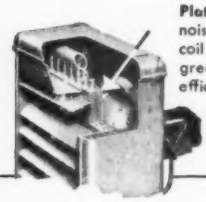
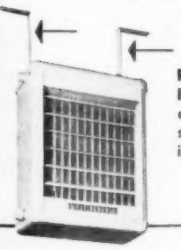
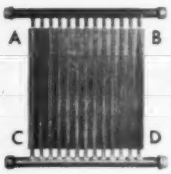


**Plate fins cut** noise, minimize coil clogging for greater efficiency.



**Pliable steel hangers (no extra cost)** simplify installation.




**Four connection combinations** (A-C, B-D, A-D, B-C) allow tight-spot installation.

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# Westinghouse Speedheaters®

## for instant heat . . . quiet heat . . . low-cost heat

**Built for strength, built for style, built to install easily and satisfy for years.**

For today's outstanding heating value, look to a pioneer name in unit heaters—look to Westinghouse Speedheaters! Check, before you specify, all the features that add up to traditional Speedheater superiority:

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Check other Speedheater values, too: the pliable steel hanger straps and flexible connection combinations (see cuts) that simplify Horizontal model installation . . . the multiple-cone diffusers on Downblast model that give positive heat control, especially desirable for buildings with high ceilings . . . the all-purpose AGA-approved Gas-Fired model that eliminates the need for central system heating. For full information call your Westinghouse-Sturtevant heating specialist now. Or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

## WESTINGHOUSE AIR HANDLING

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J-80421



(For details, use Key # X-17 on card on page 99)

# What Have They In Common ? . . .

## The Safety Engineer and The Plant Engineer

By A. B. PETTIT, Supervisor
Industrial Health and Safety
The Davison Chemical Corp.
Baltimore, Md.

## How can they cooperate?

## What happens if they don't?

WHERE DOES SAFETY fit into the industrial picture? Viewed in its broadest concept, it starts with research and continues through development, design and construction. It includes the selection of raw materials, parts and supplies, their handling and processing, and shipping the finished goods, properly labeled to safeguard the customer and intermediate handlers.

It includes the operation, altering and maintaining of the facilities and the selection and training of the required personnel. Summed up, it means producing at the peak of efficiency while safeguarding people and property within and without the plant from undue hazards emanating from operations of the plant, and protecting the capital investment and the continuity of operations.

The scope of this concept of safety is so great that no one man, regardless of his education, training or ability, can hope to do the job alone. It requires everyone connected with the plant, from president to the lowest paid employee, sincerely and actively to do his part toward achieving the objective of the safety program. Fortunate, indeed, is the safety man who recognizes this and who receives such cooperation.

Of the many people whose cooperation is so important, the plant engineer should be near the top of the list. Operating personnel are expected to operate the plant safely, and they have a right to expect to be provided with a plant which has been designed and constructed for safety and maintained in that condition.

The plant safety man has a right to expect the plant engineer to provide such facilities. A few engineers have taken the position that safety is strictly the business of the safety man. That should not be the case.

Many plant engineers are licensed professional engineers. Why are professional engineers licensed? In my own state, Maryland Public Laws, Chapter 752, Section One, says: "*It is hereby declared that, in*

*(Continued on page 36)*

# A SECOND LOOK AT WELDING HAZARDS

ARC AND GAS welding is indispensable to industry for speedy production of a host of products that could not be efficiently produced by any other means. Not only is the technique invaluable for production work but for maintenance purposes it certainly is a godsend to the harried plant engineer confronted with some new breakdown problem each day. Paint is scaled off with ease, case hardening is done in a jiffy and large pipe is heated in place for those intricate bends required to fit into congested places.

While all this is on the profit side of the ledger, there is also some concern over the hazards presented. Badly kept gear can injure workers through electrical shock, flash burns to the eyes, and burns from spurting slugs in heavy cutting operations. Welding equipment therefore must be kept in good condition, and the inspector's job is twofold: He must make detailed, periodic visual inspections for defects; and he must see that the machines get an occasional trip to the shop for the more complete electrical check.

Perhaps the most important item on the list of welding equipment is the electrode holder. Some men are quite happy with an uninsulated holder, and argue that the insulation material is too fragile and therefore cannot be depended on. The fact is that the insulated holders can be depended on if handled carefully and inspected at frequent intervals. Statistics indicate that a large percentage of accidents are chargeable to uninsulated holders or those that were in a defective condition.

Most accidents of this type occur in cramped quarters where the welder's body is wet with perspiration and is in liberal contact with the work piece. Quite often any contact the operator may make with live, current-carrying parts through wet or bare hands will not harm him seriously. But the shock he receives may cause him to react with such force and reckless abandon that he is injured in other ways. The common expression "kick like a mule" is no exaggerated expression. For direct current does act like that.

The most vulnerable feature of electrode holders is the head, protruding beyond the ring or collar of the insulating material just above the hand. That portion lacks insulation. As the worker changes rods, he may readily make contact with bare metal. If he should roll on the holder, or carry it over his shoulder as so many men do, the live part may come in contact with the neck or face.

### Grounding Hazards

One type of arc welding carelessness that recurs frequently is the utter disregard for good ground or negative return connections to the generator. Literally miles of good 3-conductor power cord to electrically driven tools have been ruined

By PAUL C. ZIEMKE

Eye protection always gets first attention in welding safety. Let's look at some of the other, less obvious hazards:

- The Electrode Holder
- Grounding of Equipment
- Storage of Cylinders
- Fire Hazards
- Dust and Fume Hazards

because the welder used a makeshift high-resistance ground on the work piece. The heavy weld current, seeking a low resistance path, courses over the third (ground) wire of the electrical tool to burn off the drill bit point and practically "cook" the insulation into a total loss.

Field welders, too, develop serious fire hazards by neglecting to bring in a ground wire to every job. An all-too-common, yet dangerous, practice is connecting the generator to an outside hydrant or building sill-cock for the ground return circuit. Welding is then attempted in any part of the building on the general premise that there is sufficient metallic interconnection between water, gas, and metal sewer lines, plus the metal structure of the building, to form a low resistance path back to the generator. That this is not always true is borne out from the number of mysterious fires that develop in service tunnels, attics and basements where arcing occurs because of the inadequate physical connection between the aforementioned services. Use of the structural steel frame of a building for grounding should be attempted only under the direction of competent electrical supervision.

Finally, there is the lazy man who knows just enough about the modern 3-phase lighting service to utilize the installation for his own benefit. Like the individual who coupled his negative return to the fire hydrant, this fellow connects his negative cable to the neutral wire of the 230–115 volt lighting service and then expects to move about the building anywhere with trailing positive cable to perform weld jobs wherever the occasion demands. This is a particularly dangerous practice since the heavy current may heat the splices and connections on the neutral wire to the point of failure.

What this man fails to take into consideration is the fact that the large, ample sized wire he couples onto in the building's service entrance does not of necessity extend all the way out to his weld site in the same size and capacity. The large size neutral wire extends only to the individual lighting distribution panels. From that point on, the wire size is drastically reduced in keeping with the type of service supplied. The average "home run" wire leading to lights and receptacles is practically a standard—#12 gauge. To weld on ventilating ducts, stacks and conduit racks under such conditions means that small conductors are annealed or burned off.

Create in the minds of the welders a healthy respect for electricity, even though the voltage is considered too low to be deadly. A paramount warning to operators should be to take special care in hot, humid weather and when welding in wet places. Almost without exception, fatal shocks occur in hot weather. The operator's physical condition and the condition of his clothing should be his guide.

### Precautions for Welders

1. Use care in laying down your electrode holder so that it does not make contact with conducting material. 2. Carry the electrode holder in your hand, not crushed under the arm, or slung over the shoulder. 3. Don't carry the holder about with a rod in it. 4. Don't work alone in confined places where a bump on the head, or metal fumes may knock you out and help may be slow in getting to you. 5. Exercise particular care in high places where it is foolhardy to cling with one hand while welding with the other. Use standard staging material and don't stand on barrel heads or packing cases to reach a high place. 6. If you must work from a ladder erected in a doorway or aisle see that you have a helper at hand to guard against passing traffic. 7. Do wear the special chrome tanned leather jacket, and keep your pants bottoms out of your shoe tops or you will get a "hot foot" that won't be funny.

### Fire Hazards

The Livonia fire of the General Motors Co. rated the biggest loss for a single production unit, all because of an error in planning the protection needed against flying slugs of hot metal. Portable extinguishers merely halted the fire momentarily, and then it raged speedily out of control before the arrival of the city fire fighters. In fact in most plants using much arc welding or gas cutting apparatus, the fire runs made to extinguish hot metal slug fires far outnumber those of any other cause.

Potential fire hazards should all be eliminated before welding or cutting is begun. There are many approaches to this. Probably one of the most effective procedures is the issuance of a welding and burning permit before work can commence. The operator asks for this permit from the department head for whom the work is to be performed. It is he who is best informed on the hazards peculiar to his department and therefore is best qualified to make all arrangements to have combustibles blanketed or moved, floors watered down if of wood, and all flammable gas producing equipment shut down and vented. If the nature of the installation warrants it, the depart-

ment head must appoint a reliable monitor to watch the operation for the full time the work is in progress. Armed with a suitable extinguisher he should remain at the welding site about a half hour afterwards to watch for any vagrant slugs that escaped his notice while the work proceeded. Failure to do that resulted in a 2 million dollar fire that raged for two days in a warehouse.

Oxygen and acetylene hose should be inspected and pressure tested every 60 days and no one but the authorized shop individuals should make up the connectors of the suitable right and left hand threads. Patching is ruled out at any time. Tape, no matter how well applied, never made an acceptable seal. It merely covers up a bad situation that leaks gas to fill a room with an explosive mixture, or permits the hose to catch fire as the leaking jet of acetylene contacts a spark. Usually, it's only a matter of seconds before the jetting flame burns through the adjoining oxygen hose and then the welder had better sprint fast for the regulator valves. The burning rubber and the incomplete combustion of the acetylene can literally fill up a room with floating carbon, like a "black" snow storm.

In one Tennessee plant the oxygen hose burst with such violence that it caused the rupture of an ear drum. The rigger who was cutting structural steel had run the pressure on the regulator up too high and was using the torch valve to control the pressure in balance with his acetylene supply. In another instance, a gauge exploded violently blowing out all the windows from the little repair shop, and peppering the workman with fine bits of pulverized glass from the gauge bezel. The cause? Someone unfamiliar with the hazard of the reaction between oxygen and oil had used the standard shop gauge for calibrating the controls on a hydraulically powered elevator. The very legible inscription on the white face of the dial —"USE NO OIL"—apparently meant exactly nothing to that benighted soul. But for the shielding effect offered by the bulk of the oxygen cylinder, the shopman would have been killed by the flying shrapnel shot out from the exploded gauge.

Oxygen cylinder that exploded because of exposure to heat and softening of lead seal.

### Rupture Disks and Fusible Links

One of the accompanying pictures shows the need for proper storage for all compressed gases, especially the fuel gases. The cylinder had been stored on the westerly side of a warehouse where the full rays of the summer sun beat down on it all the day long. Later, the cylinder was brought indoors to the small storage room adjacent to the shop. At the new location no overexposures to heat occurred, yet suddenly the storage room door was torn from its hinges, carrying with it the door frame stops and the strike plate. A close examination of the cylinder by experts in the field of compressed gases revealed what appears to be a logical sequence of events. The exposure to high solar heat on the outdoor platform had so softened the fusible lead plug on the safety cap that the lead extruded from the recess against the rupture disk. This slow movement of the lead caused the disk to flex and partially fail, yet the oxygen was still obstructed by the lead seal and hence did not escape to the atmosphere. However, at some moment when the cylinder stood chained to its stanchion in the auxiliary warehouse one extruded portion of the lead seal let go and the rupture disk then failed completely, producing a jetting stream of oxygen downward on the ferrous metal threads of the protective metal cap and its associated swaged-on collar.

At 2,300 lbs. pressure the escaping oxygen reacted speedily with the excellent reactive material formed by the admixture of fine rust particles and the residual fatty materials left after years of smearing the valve threads with soap suds to check for tightness of gauges and fittings. The speed and effectiveness of the reaction is indicated by the fact that an area the size of a silver dollar was heated to incandescence through three thicknesses of metal. The weakened metal was then forced upward with the violence of a small volcano to splatter oxidized ferrous metal over the upper warehouse wall surface where several incipient fires were kindled on wood cross members. A fire was also kindled on the wood plank which formed part of the chaining arrangement at midpoint of the cylinder's length. This fire bears out the theory that the first reaction occurred as the jetting oxygen burned through the cap and collar, and so softened the cylinder wall that it failed under pressure.

A check with experienced warehousemen discloses the fact that on many occasions they find cylinders completely exhausted as the result of this slow heating and softening of the lead seal above the rupture disk. The copper disk then develops a minute opening where its outer edge bears against the sharp shoulder of the valve tee to permit a slow, sometimes completely noiseless, release of the 400 cu. ft. of gas. While the Interstate Commerce Commission requires these two protective features on all cylinders to safeguard

*(Continued on page 86)*

# Molten Metal Miracle

***It was a day like any other day . . . and then it happened . . .***

TO ALL WHO saw the accident, and particularly to Peter Aaron —the man to whom it happened— it was a molten metal miracle that will never repeat itself.

Pete is a melter at Jack & Heintz, a Cleveland, Ohio, concern making special electrical devices for aircraft. On this particular afternoon, as on many another, Pete finished his lunch and went over to the die casting department to relieve one of the melters.

### Not Particularly Dangerous

There is nothing particularly unusual or hazardous about the die casting department. As in other similar operations, it is a busy unglamorous place where men pour molten metal into dies, apply pressure and take the finished casting from the press. As in any other plant area, the men take the usual safety precautions.

### Regular Routine

Pete put on his safety goggles and his gloves. He picked up the ladle which was sitting on the cauldron, and dipped the ladle into the molten aluminum.

And then it happened.

As Pete, himself, put it:

"Just as soon as my ladle hit the aluminum, there was a sharp crack. I blinked for a split second, and when I opened my eyes, I couldn't see a thing. Everything was dark."

What had happened was that the molten aluminum (1250 degrees F.) exploded. Ordinarily, such an explosion would have easily bathed a workman's head and shoulders and caused death. But, in this case, for no explainable reason—the molten aluminum changed its habit. Instead of a bath, the explosion resulted in twin streams that shot out of the cauldron and headed, unerringly, at Pete's goggles. The aluminum formed a solid half-inch coating on the outside of the goggles and dripped over to cover the inside of the goggle lenses.

### Minor Burns

Miraculously, the aluminum did not splash anywhere on Pete's face. Except for a few very minor burns caused by the rapid heating of the goggle frame and bows, Pete was unhurt . . . in fact, back on the job.

Of course, the die casting department was no longer the unglamor-

This reposed picture shows what Peter Aaron looked like within seconds after dipping his ladle. Splash burned hole in his cap.

ous, unvisited place of the past 10 years. Workers, plant engineers, plant paper reporters and photographers, everyone within the area came to look at Aaron and his goggles . . . and to hear him recount the happening.

### Engineers on Job

Plant engineers, while awed by the accident, were there on business, too. It was their job—particularly those responsible for safety—to determine what caused the accident. These technical men were happy to learn that Pete was unhurt—not only from the standpoint of human sentiment—but also because they are jealously protecting an outstanding record of safety at Jack & Heintz—more than 8,000,000 man-hours without a lost time accident. To make certain such an accident would not happen again—for most certainly providence would not repeat its charitable act as it had for Pete—the safety engineers investigated thoroughly.

### What Happened?

Absolutely nothing appeared out of kilter. Only theories could be projected. The one which seems the most logical is this:

Melters go through a special ritual with ladles before dipping them into molten metal. They first dip the ladle in a lime solution to prevent metal from adhering to the ladle cup. The ladle is then dried and heated so that its temperature is close to that of the molten metal.

The theory is that although Pete had examined the ladle before using it, it was not completely dry . . . that some of the lime solution had not yet evaporated. This very minute moisture sparked the explosion.

Today, the goggles are on display at the plant as a "silent sermon on safety goggles." No one has any doubts about what would have happened to Pete if he had been lax about putting on his goggles that day.

Pictures by S. Sam Andraitis, courtesy of Jack & Heintz, Inc.

SAFETY
THESE
SAFETY GOGGLES
... SAVED THE EYESIGHT OF PETER AARON. MOLTEN ALUMINUM AT 1250°F SPLATTERED ON THE LENSES. EXCEPT FOR A FEW MINOR BURNS, PETE WAS UNHURT.
SOME PEOPLE SAY PETE WAS LUCKY. IT WASN'T LUCK. IT WAS GOOD COMMON SAFETY SENSE PETE USED IN WEARING HIS SAFETY GOGGLES.

The company made a dramatic safety display of the goggles and accident pictures.

## Minors Under 18 Barred From Powered Paper Machines By U. S.

BOYS AND GIRLS under 18 years of age have been prohibited from operating 14 different types of power-driven paper products machines under a hazardous occupations order issued by Secretary of Labor James P. Mitchell. In application, this order applies wherever such machines are used, including plants producing converted paper products and in such businesses as job-printing shops, bookbinderies, stationers, and various other non-manufacturing establishments. Although injuries to workers on machines covered by Hazardous Occupations Order #12 are not too frequent, such injuries are often very severe when they occur, Secretary Mitchell said.

### Prohibited Jobs

The prohibited jobs will include operating or assisting to operate any of the following machines: Arm-type wire stitcher or stapler, circular or band saw, corner cutter or mitering machines, corrugating and single- or double-facing machine, envelope die-cutting press, guillotine paper cutter or shear, horizontal bar scorer, laminating or combining machine, sheeting machine, scrap-paper baler, or vertical slotter. Also included is operating or assisting to operate any platen die-cutting press, platen printing press, or punch press which involves hand feeding of the machine.

### Apprentices Exempt

The prohibition will not apply to apprentices, or to certain students employed in cooperative vocational training programs under strict conditions specified in the order itself. The Secretary added that the order does not relieve an employer from the obligation to comply with other Federal, State or municipal regulations that establish higher standards.

# Air Casualties

***It's bad air that does it. But you can step up production by putting a Coppus Blower on the job to keep the air moving — and keep the men cool.***

The kind of air a man works in has a lot to do with how much work he can turn out.

In confined places like shipholds or tanks or drums or boilers . . . or wherever the air is stagnant or hot or full of fumes . . . a Coppus Blower is a *must* for getting first-class work out of the men, all the time.

A Coppus Blower or Exhauster helps avoid sickness and lassitude due to bad air . . . and improves morale, too.

Portable and adaptable for special purposes, Coppus Blowers and Exhausters will have dozens of uses around your plant. The "Blue Ribbon" (a blue painted band) is your assurance of quality performance at lowest cost.

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**BLUE RIBBON BLOWERS**

***THE BLOWERS THAT PUT MORE MINUTES IN EVERY MAN-HOUR***

**CABLE MANHOLE AND TANK VENTILATORS — BOILER MANHOLE BLOWERS AND EXHAUSTERS — HEAT KILLERS — SHIPHOLD VENTILATORS . . . DESIGNED FOR YOUR INDUSTRY — ENGINEERED FOR YOU**

***MAIL THIS COUPON*** To Coppus Engineering Corp., 330 Park Avenue, Worcester 2, Mass. Sales offices in THOMAS' REGISTER. Other "Blue Ribbon" Products in BEST'S SAFETY DIRECTORY.

**PLEASE SEND ME INFORMATION ON SUPPLYING FRESH AIR TO MEN WORKING:**

- ☐ in tanks, tank cars, drums, etc.
- ☐ in underground cable manholes.
- ☐ in aeroplane fusilages, wings, etc.
- ☐ on coke ovens.
- ☐ on steam-heated rubber processes.
- ☐ on boiler repair jobs.

COOLING:

- ☐ motors, generators, switchboards.
- ☐ wires and sheets.
- ☐ general man cooling.
- ☐ around cracking stills.
- ☐ exhausting welding fumes.
- ☐ stirring up stagnant air wherever men are working or material is drying.
- ☐ drying of walls, sheets, etc., after treated with coating material.

NAME .....

COMPANY .....

ADDRESS .....

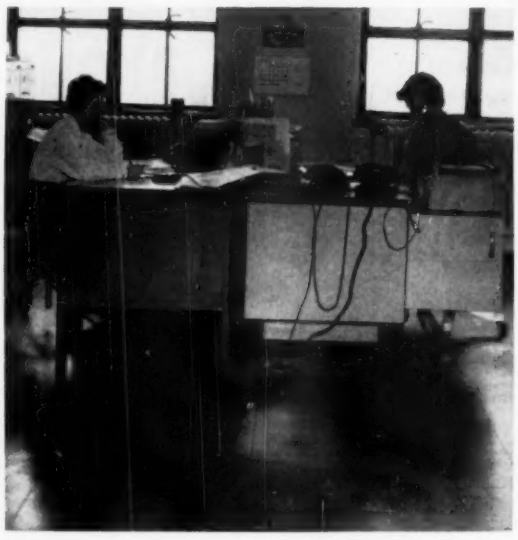
CITY .....

(Write here any special ventilating problem you may have.)

# A NEW

## and tha

Looking at new wax on floors reveals high gloss which is increased by walking on the floors. However, the safety factor which prevents falls cannot be seen . . . it has to be walked on!



Office workers at desks need not be worried by falls on slippery floor since new wax has high safety factor, reducing skidding to the very minimum.

The long, tiring day of the constantly walking nurse is shortened, the uncertain steps of small patients are made more certain, and the comfort, safety, and efficiency of this hospital are increased tremendously by the new floor safety wax.

By CARL LAMM

MANUFACTURERS of floor maintenance products have been striving for years to develop a floor finish that was both efficient and safe at the same time. Needless to say, maintenance people, safety engineers and the average householder have been just as keenly interested —maybe more so. It has seemed that it would take something of a minor miracle to produce a floor finish that would protect the floor itself, have a high gloss, resist dirt and still be non-slippery.

### Traditional Finishes

Waxes have been the traditional finish for many types of floors. Their chief difficulty has been that the brighter the gloss, the more slippery the floor has become. Too often, safety was sacrificed for appearance. In more recent years, maintenance products manufacturers have tried to solve the problem by featuring finishes based on synthetics instead of wax. However, some of these materials do not stand up well and in a short time the floor becomes dull looking and dirty. Others are dirt collectors and make the floor tacky.

With continued research, however, modern chemistry has developed and perfected a water emulsion wax that combines all the properties expected of an A-1 quality

# FLOOR WAX...
# t's no skidding!

floor wax. It is based on Carnauba and, according to independent laboratory tests, has about a 40 percent higher coefficient of friction than is necessary for minimum safety requirements. The wax has now been thoroughly tested for about two years, with some rather startling results.

### Unusual Properties

For example, insurance companies have for many years rejected water emulsion waxes based on Carnauba, but this newly developed wax has been accepted and listed as a safety wax by them. In field tests of the new wax, slippery floors that had formerly caused frequent accidents, some so serious as to result in hospitalization of the injured, have not had a single accident after using this material with its 40 percent higher coefficient of friction.* One insurance company has stated that this new wax has eliminated 75 percent of its accident headaches.

How does this new self-polishing wax differ from former floor waxes?

a. In the past, when a waxed floor was buffed, it attained a higher gloss, but also became more slippery. With this new wax, the situation is reversed. Now, the more the wax is buffed, not only is the gloss increased, but ***the floor becomes less slippery!*** In other words, the coefficient of friction is increased by buffing. In fact, it will increase just by walking on the floor! Furthermore, the finish will not become tacky or a dirt collector.

b. Floors can be maintained more easily. Damp mopping and rebuffing will return the finish to its original gloss for many weeks and even for months. The durability is so outstanding that some users have reported maintenance costs slashed by as much as 50 percent.

c. A special formulation of this new wax resists break-down of the emulsion at freezing temperatures.

d. Another newly developed variation also has a very high coefficient of friction and, in addition, is waterproof. This is an important factor in rainy weather or during the winter months when tracked-in snow and ice ordinarily break down the water-emulsion type waxes.

e. There is still another new type of wax that resists water, alcohol, and urine. It has been used with great success in hospitals and mental institutions.

### Removing Old Wax

Many of the floor cleaners, removers and detergents on the market are strong alkalis and sometimes cause a "bleeding" of the floor. Such cleaners not only harm the floor surface, but they can also influence the waxing process adversely.

At the same time the new waxes were being developed, research was also underway for a new and better cleaner that would completely remove the old finish without damaging the floor. Such a cleaner has been formulated. It has a ph of 8.4, makes old floors look like new, and helps in achieving the maximum results with floor wax.

In an institution the design in the floors appeared to be worn away. Many products and methods had been used in trying to revitalize the floors, but with little success; and it had been about decided that all the floors would have to be replaced. However, when the new cleaner was tried, the floors regained their original color and design. In fact, visitors thought a new floor had been installed.

### UL Approved

These newly developed floor waxes and the new type of cleaner have been tested and listed by Underwriters' Laboratories, Inc. and The Rubber Manufacturers Association, Inc. These approvals mean that users can be assured of the safety and quality of the products. The waxes and cleaner have undergone thorough testing and use by insurance companies, hospitals, schools, hotels and office buildings. The comments from all these varied sources are the same: the appearance of the floors is much better, the maintenance easier, and the accident rate has dropped to practically nil.

* Readers may obtain the name and address of the manufacturer of these new maintenance products by writing to the Editor.

# WESTERN MAINTENANCE SHOW

THE FIRST WESTERN Plant Maintenance Show registered nearly 7,000 key personnel from Pacific Coast industrial plants during its 3-day exhibition at Pan Pacific Auditorium in Los Angeles.

Keen interest was indicated by both exhibitors and registrants, and great diversity was shown among the 144 displays at the show which was managed ably by Clapp & Poliak, Inc. These exhibits displayed basic products and equipment to supply the modern plant maintenance operation as well as many new developments in the field presented for the first time at this show. Among these was a radioactive safety control for fast punch, brake, and other types of dangerous machines, which operated through strategically located geiger counters. Another was a new type of phosphor for illumination which increased light intensity more than 6%. A third was a new series of directing tapes and plant markers.

Power brushes, cleaners, solvents, scaffoldings, delicate control instruments, disinfectants, and automatic doors were dramatically emphasized among the long known products of the nation's top manufacturers.

Saul Poliak, head of the management firm, said, "This first show, both from the point of view of exhibits and attendance, proved most satisfactory. It is, in fact, larger than the first national maintenance show which we produced several years ago.

"The keen interest of western plant owners and managers in the maintenance function indicates their awareness of the cost saving factors possible in efficient maintenance.

"The response to this first show has encouraged us to continue it in Los Angeles in 1955. We have arranged with Pan Pacific Auditorium for the dates of July 12, 13, and 14 and a number of exhibitors have already applied for space."

The first Western Plant Maintenance Conference, with L. C. Morrow as conference chairman, took place concurrently with the Show at the Ambassador Hotel and attracted 250 maintenance executives. The papers presented by the panel were highly informative and pertinent. Without exception the speakers stressed the importance of planned maintenance and protective maintenance, and the importance of careful organization and clearly defined duties of the department and its staff.

C. A. Gallaher, Robertshaw-Fulton Controls Company, Anaheim, Calif., said, "High precision products which are now manufactured in western plants have brought about changes in plant maintenance techniques.

"To maintain equipment, organized programs are necessary and carefully defined and authoritative supervision is essential."

L. A. Beck, General Electric Company, Los Angeles, said, "Today's 'industrial revolution', the gradual but determined swing toward automation, has developed a need for 'productive maintenance' to create added output without additional machines. . . . It is important that maintenance be given a position equal to production by management.

"This (protective maintenance) is achieved by thorough organization and planning—stocking critical parts—knowing your equipment—and planning equipment repairs in a programmed manner."

Maurice Olchoff, Solar Aircraft Company, Des Moines, said, "Mass production has led us into periods of technocracy and automation. It is now to a point where we are finding more maintenance men than production men.

"Eight years ago we realized the need to develop technically trained engineers to maintain the complex machines this plant uses.

"We consider good labor relations important for the most efficient maintenance team. Our plant engineers work closely with supervisors and workers and hold weekly meetings to study problems together."

### Maintenance Costs

George J. Martin, National Biscuit Company, New York, said, "Management is now adopting cost accounting principles to maintenance as well as production—closely comparing daily costs with production costs to improve efficiency of both. Anything that reduces maintenance efficiency invariably increases depreciation and production costs.

"Carefully kept records of equipment, history, inspections, repairs, etc., as well as actual scheduling of maintenance work are important to efficient organization and management. . . . Good planning and executive reports will effect maintenance savings of 10% to 15% in most plants."

Bruno Pilorz, California Packing Corp., San Francisco, said, "Food plant cleanliness is a state of mind which should be sold to every supervisor or foreman to have the job done efficiently."

James Roy Jones, Westinghouse Electric Corp., Los Angeles, said, "Lighting maintenance serves a dual purpose. It usually reduces the over-

(Continued on page 91)

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## Maintenance Bibliography

"SELECTED BIBLIOGRAPHY ON Building Construction and Maintenance," National Bureau of Standards Building Materials and Structures Report 140, by L. D. C. Nobel, 35 pages, 30 cents. (Order from Government Printing Office, Washington 25, D. C.).

This report gives sources of information concerning building construction and maintenance. It contains titles of papers dealing with the practical aspects of building construction and some publications of a more technical nature. The list includes both free and sale publications available from Government, trade associations and universities. Also listed are a few of the standards relative to construction and maintenance issued by the American Standards Association and the American Society for Testing Materials, as well as some specifications of the Federal Government.

## ASA Revises Code For Machinery Guards

AN AMERICAN STANDARD safety code just revised recognizes that men today are taller. Incorporating safety practices for the protection of operators of power machinery, it now requires the guarding of all transmission equipment to minimum heights of 7 feet.

Announcement of approval of American Standard Safety Code for Mechanical Power-Transmission Apparatus, B15.1–1953, is made by Cyril Ainsworth, Technical Director of the American Standards Association.

Mr. Ainsworth states that realization of the need for guarding machinery to greater heights came about during the last war. Practices have gradually changed accordingly, so that the revised code brings the requirements into line with them. Previous editions of the standard provided that transmission equipment be guarded to minimum heights varying from 5 feet 6 inches to 6 feet 6 inches. For the first time, safety requirements for V-pulleys and V-belt drives are included in the code's recommendations. This is in recognition of the newest methods of power transmission.

This edition of the 26-year-old code is expected to aid in the reduction of accidents by bringing about greater uniformity in legal requirements. The code deals with the guarding of all revolving and reciprocating parts of equipment used in the transmission of power. Included, for example, are guarding requirements for shafting, pulleys, belts, chains, gears, sprockets, couplings, clutches, and counter-weights.

According to Mr. Ainsworth, guarding of machinery at the source of manufacture has lagged because of lack of uniformity in nationwide requirements. Incorporation of guards at the design stage, made increasingly possible as local regulations are brought into conformity with the code, has these advantages —it results in better design, lower costs of guard installation, and enables purchasers of equipment to specify compliance with code requirements in purchase specifications.

The code is intended as a guide to the producers of machinery, to enable them to incorporate guarding in the design and manufacture of equipment; as a guide to the purchaser and user of machinery, to see that equipment is up to specifications; and for adoption by state regulatory authorities concerned with industrial accidents.

The code was developed and revised by a technical committee of the American Standards Association representing manufacturers of mechanical power transmission equipment, users, insurance groups, and enforcement officials.

Copies of American Standard Safety Code for Mechanical Power-Transmission Apparatus, B15.1–1953, are available from the American Standards Association, 70 East 45 Street, New York 17, N. Y. or the American Society of Mechanical Engineers, 29 West 39 Street, New York 18, N. Y. for $1.00 each.

## Safety Handbook

A COMPLETELY REVISED edition of the "Handbook of Industrial Safety Standards," is now available according to an announcement by the Association of Casualty and Surety Companies. The new ninth edition, which is 50 percent larger than the previous edition, includes several new chapters, illustrations and tables in its 315 pages.

Encompassing 38 chapters and four appendices, the handbook is a concise but comprehensive compilation of industrial safety requirements recommended by nationally recognized authorities including the American Standards Association, the National Fire Protection Association, the American Society of Mechanical Engineers and various governmental organizations. Much of the text material is an amplification and extension of the various codes on which it is based, and some sections deal entirely with topics not covered by any existing standards.

The subject matter of the handbook includes many industrial safety

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topics: safety programs, accident investigation, materials handling, boilers and unfired pressure vessels, machine guarding, illumination, exhaust systems, electrical equipment, spray coating, tank operations, building exits and prevention of "off-the-job" accidents. Completely new chapters have been added on welding and cutting, storage and handling of flammable liquids, radiation hazards and disaster control. Included in the appendices are an index to American Safety Standards, a table of maximum allowable concentrations of toxic substances and a classification of fire extinguishing appliances. Copies may be obtained from any of the Association's member companies or directly from the Association at 60 John Street, New York 38, New York, at $1.40 per copy.

## Work Injury Bulletin

A COLLECTION OF basic work-injury data for each of the major industries, through which a company may evaluate its own record, is announced by the U. S. Department of Labor covering the year 1952. Bulletin 1164 contains estimates of disabling work injuries by major industry group, injury-frequency rates, including national averages for each industry for the year, rates by month and quarter for the year, rates by size of reporting unit, and injury severity rates and average days lost per case.

Copies are available at 30¢ each from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

## Maintenance Review

THE ANNUAL volume containing the proceedings of the Plant Maintenance & Engineering Conference have been published by Clapp & Poliak, Inc., New York.

The book, which is an important statement of current factory maintenance problems, is the most extensive ever published in the series. It contains texts of papers read by 24 authors, and direct answers to more than 1,300 questions.

An outstanding new feature this year is the summary of 20 round-table discussions, each of which ran for 5 hours. Separate roundtables were devoted to chemical plants, breweries and distilleries, food processing and packaging plants, paper mills and paper product plants, petroleum refineries, sheet metal plants, steel mills and textile mills.

The conference is the largest of its kind in the country. Last January, 2,400 engineers attended from every major industry and from many foreign countries. The book is sent without charge to those who attended. Others may obtain it from Clapp & Poliak, Inc., 341 Madison Av., New York 17, for $7.50 postpaid.

## Aviation Safety Manual

"GROUND SAFETY IN AVIATION Operations," a 71-page illustrated manual, has been published by New York University's Center for Safety Education and the American Museum of Safety. The manual offers information on the protection of the public, ground handling of aircraft, ramp and field emergencies, ladders and workstands, handling cargo, automotive equipment maintenance and operation, servicing communications equipment, accident investigation methods, and safety committees and inspections.

Single copies of the publication may be obtained for $1 from the Center for Safety Education, Division of General Education, New York University, Washington Square, New York 3, New York. The price for 10 or more copies, is 90 cents each.

## Revised Data Sheet On Butadiene

A REVISED SAFETY data sheet on butadiene, a chemical widely used in the manufacture of rubber products, is now available according to an announcement by the Manufacturing Chemists' Association.

Chemical Safety Data Sheet SD-55, covering the properties and essential information for the safe handling and use of butadiene, has been revised to include more up-to-date and complete information. In the interest of safe handling of this material, a number of important changes have been made in the sections relating to personal protective equipment and general handling procedures.

Copies of SD-55, Butadiene, may be obained from the Manufacturing Chemists' Association, 1625 Eye Street, N. W., Washington 6, D. C., at 25 cents each.

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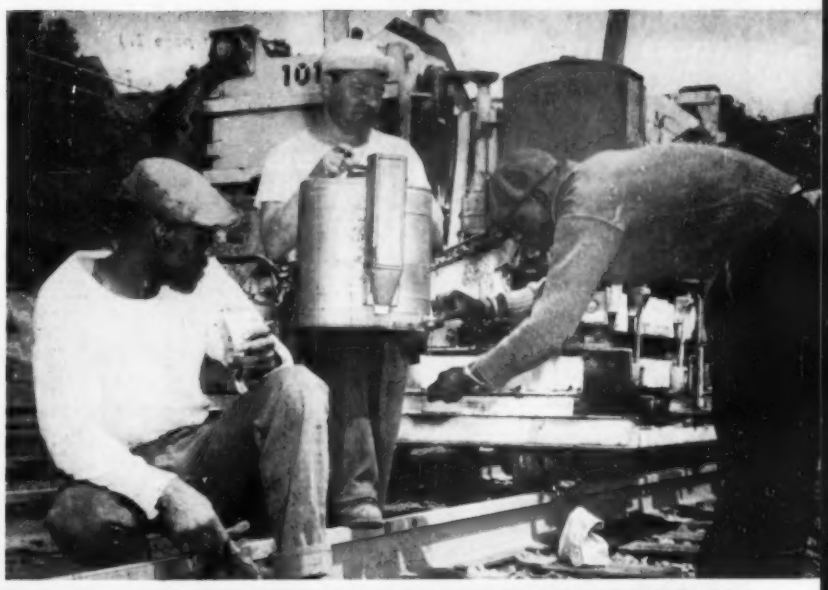

# CLEAN WATER FOR "GANDY DANCERS"

THE RAILROAD CREWS who keep the nation's thousands and thousands of miles of track and roadbed in shape are referred to formally as "maintenance of way employees." In the railroader's jargon, however, they have always borne the colorful name of "gandy dancers." The origin of the name is lost in railroad antiquity.

Through the years, from the time of the earliest steam-driven engine to the era of diesel and electrically-powered engines, the job of the "gandy dancer" has remained the same—replacing worn ties and rails, shoring ballast on the roadbed, straightening shifting rails, and similar tasks. On many roads, though, the tools with which he does the job have been modernized.

Modernization, however, has been slow in overtaking what has practically become a symbol of the railroad track gang—the unsanitary common drinking cup and water pail or keg. But now many railroads are replacing the tin cup and pail with more sanitary methods of water service, chief of which is the portable water tank and individual paper drinking cup.

The importance of water to the track is best pointed up by a railroad maxim: "The tracks are the hottest place in the world in summer and the coldest in the winter." Most of the major jobs on the track are undertaken in the summer. Copious amounts of water, therefore, are essential for men engaged in such laborious work because they perspire constantly and profusely.

### Up-to-Date Water

The Central Railroad of New Jersey is an excellent example of a railroad introducing up-to-date watering equipment for track gangs. Several years ago, Mr. C. H. Vogt, chief engineer of the CRR's maintenance of way department, started experimenting with a number of modern watering methods. This was prompted by his desire for better sanitary conditions, and was in line with the road's policy to effect modernization of equipment throughout the system whenever and wherever possible.

### Portable Water Tank

After testing several types of equipment, Mr. Vogt settled on portable water tanks and paper cups. Aside from the sanitary aspect, Mr. Vogt explained, the water tank-paper cup has other values: The water is cleaner because no dirt, grit, leaves and other flying particles get into the tank as they did in the open water pail; the water is more palatable because it remains cool in the insulated tank compared with water in open pail and wood keg which warmed during the day. In addition, the tank can easily be handled by one man who carries it knapsack style. The paper cup dispenser is attached to the tank.

By courtesy of Paper Cup & Container Institute, Inc.

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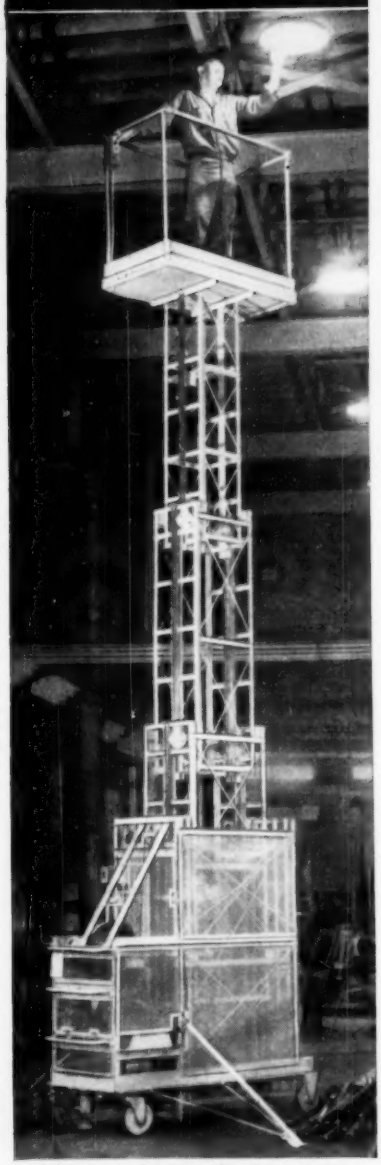

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## Engineers and Safety

*(Continued from page 21)*

*order to safeguard life, health and property, and to promote the public welfare, any person practicing or offering to practice engineering or land surveying, shall hereafter be required to submit evidence that he is qualified so to practice and shall be registered as hereinafter provided;——".*

That opening paragraph spells out clearly that to practice engineering one must have a professional engineering license strictly in the interest of safety.

To further drive home this responsibility, the following quotations are offered from the "Canons of Ethics for Engineers," prepared by the Engineers' Council for Professional Development. The "Foreword" states: *"It is his duty to interest himself in public welfare, and to be ready to apply his special knowledge for the benefit of mankind.*

*"Section 11. He will guard against conditions that are dangerous or threatening to life, limb, or property on work for which he is responsible, or if he is not responsible, will promptly call such conditions to the attention of those who are responsible.*

*"Section 12. He will present clearly the consequences to be expected from deviations proposed if his engineering judgment is overruled by nontechnical authority in cases where he is responsible for the technical adequacy of engineering work."*

Now, these quotations should convince most of those who hesitate, but there is an occasional die-hard who says, "Why is the safety of the plant my responsibility? Why is it not the responsibility of the safety engineer—is he not an engineer who specializes in safety?" Perhaps he is a professional engineer, but more often he is not, and, surprising as it may appear, many of the best safety men are not professional engineers. Of course, Webster says, among other things, that engineering is "maneuvering and contriving." Any safety man worth his salt will have to do a lot of both!

That does not make him a professional engineer, and, perhaps, the name "safety engineer" should have never been coined. The safety man needs to know something about engineering, but he also needs to know something about processing, material handling, economics, medicine, law and psychology. He must have the ability to search out, analyze and understand facts and be able to express his conclusions clearly and forcefully, orally and in writing. He must know something about human relations. He must have a missionary's zeal to do good for his fellowmen and be a super salesman. He must have the knack of getting all kinds of people to work with him in a common effort to promote their mutual safety. Perhaps, it would have been better to call him a "consultant to management on safe and efficient operations," or he might be called an accident prevention specialist.

### Cooperate with Specialists

Now if the plant engineer is to do a capable job, he must consult and cooperate with experts and specialists when his company's interests are best served by such service. The safety specialist is a consultant on human relations, and certainly the best interests of the company are being served when the suffering and economic loss to employees from accidents is reduced. The employer depends on employees to produce the finished goods, the sale of which enables him to pay wages and salaries, amortize his facilities, give the stockholders a fair return for the use of their savings, and support the government through taxes and worthwhile community and charity projects through contributions. Anything the plant engineer can do to maintain the productive capacity of the employees falls within his responsibilities to maintain the productive facilities of the plant as a whole. Most plant engineers recognize this and want to do something about it, but under

the pressure of work it is easy to become so absorbed in certain phases of the job that other factors of equal or greater importance are overlooked.

Having explored the plant engineer's responsibilities and duties, it seems proper to consider how he and the safety man can best collaborate in their common interest.

If a new plant is to be constructed or additions or alterations are to be made, it seems logical that the plant engineer should incorporate into his plans the safety, health and fire and explosion protection features which he believes should be included. If he is in doubt, he should consult the safety man. When his plans are completed, they should be reviewed by the safety man. While he may not be as informed on engineering as the plant engineer, he may, as a specialist in safety, find a few hazards the plant engineer overlooked. His ideas may seem absurd at first, but they should not be dismissed too hurriedly. Remember the old axiom that "Two Heads Are Better Than One" and realize that this is especially true when the two heads concerned have two different viewpoints. The original plan may be the best possible, but the plant engineer cannot be sure unless he gives full and impartial consideration to the other viewpoint.

In a test, the plant engineer's position may be sustained by top management. That, however, is of little comfort if subsequent events prove him wrong. This is not meant to imply that the safety man is infallible. Often he may make mistakes which, after careful study, must be opposed. All that is suggested is that one carefully consider his recommendations, and when there is disagreement that the two should get together, exchange information and sincerely try to reach a meeting of minds. Neither should be arbitrary; each should honestly strive for the best solution to the problem. After a frank discussion and sincere study, each has the right and duty to stick by the position he has concluded to be the right course. I have almost universally found

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*American Cancer Society*

plant engineers to be cooperative and open-minded. There have been a few who did not measure up, but they were very much in the minority.

### Maintenance Problems

Over and above the problems posed by additions, alterations, changes in methods, processes and machinery and the construction of new plants, there is always the matter of maintenance. The best designed and constructed plant can rapidly deteriorate through the lack of proper repairs or preventive maintenance. Here again, the responsibility is the plant engineer's. Slipshod maintenance and failure to observe fundamental safety practices often result in unsafe operations. The victims may be operating employees, maintenance employees or others. In any case, the employees and the company suffer.

We have discussed the philosophy of cooperation by the plant engineer and the safety man, but, perhaps, a few examples of what happens when this cooperation does not exist will best illustrate the reasoning behind the philosophy.

These brief case histories did not occur during my experience with my present employer. They occurred in various companies and plants with which I have been associated in the past.

The small mills used in rubber laboratories are very dangerous—most are equipped with "start," "stop" and "reverse" buttons. Rubber frequently sticks to the rolls, and, to remove it, the mill is stopped and the band of rubber is cut and loosened. The operator then holds the loose end on the discharge side of the rolls and starts the mill. This can be a safe procedure if followed carefully, but, at times, the operator inadvertently presses the "reverse" button. To overcome this trouble, a very simple flap was secured over the "reverse" button so that it had to be pushed aside to reverse the mill. They were installed on all mills in one laboratory, and sketches were sent to the engineer at a laboratory in a distant city. The engineer did not think the simple, inexpensive safety devices were needed. They were installed, however, after a pre-med student, working his way through school, lost a hand by accidentally reversing the mill.

Another laboratory used a small, power-driven extruder to de-water samples of coagulated rubber. It was suggested to the engineer in charge that the feed box be extended to prevent the operator's fingers getting caught in the screw. On a return visit, it was found that the suggestion had not been followed. Questioned, the engineer said that he had provided a wooden pusher. It was again suggested that the feed box be extended. He stubbornly opposed it. Inside of an hour, a girl lost a finger in the extruder. Upon investigation, it developed that the use of the pusher had been discontinued to avoid getting wood splinters in the rubber samples.

### Condenser Ruptures

The tube bundle of an overhead condenser in a petroleum plant had received a hydrostatic test and was returned to the shell. The shell was being purged with steam prior to putting it on the line. The steam was kept on longer than usual, as the workmen were attempting to stop some leaks they had observed. The tube bundle ruptured with such force that several men were killed and the channel head of the condenser was blown through the air at a terrific speed barely missing lines carrying liquefied petroleum gases. Had these lines been cut, a very serious fire would have occurred. It developed that an engineer decided that the hydrostatic relief on the inlet to the bundle, as recommended by the safety department, was not needed. The workmen had failed to drain the bundle after the hydrostatic test, it was valved off liquid-full and upon the application of heat a very high internal pressure was developed.

At another plant the intake to an air compressor was mounted on a flat roof which was surrounded by

a parapet. During a turnaround while catalyst was being reactivated by passing superheated air through it, a terrific explosion occurred in the air tank. In its passage through the air, the tank severed a number of large lines containing flammables and a very destructive fire resulted. Subsequent investigation developed that lines carrying liquefied gases were equipped with safety valves where they crossed the roof and that during the turnaround operations these valves had been discharging some of their contents. Being heavier than air, the gases were trapped on the roof by the parapet and entered the air intake. When the concentration in the compressed air had reached the explosive range it was ignited by the superheater with the resultant explosion.

A very hazardous condition was created when it was decided to install a product baler. Interlocking guards to prevent the baler closing when the guards were not in place were recommended to all plants. The engineer at one plant did not think they were necessary. They depended upon their foremen to enforce the rules that employees keep their hands away from the balers while in operation. One of the foremen who was expected to enforce the rules reached into the baler for a product sample. He was not quick enough and lost an arm.

At a metal-working plant, acid tank cars were unloaded just outside an enclosed passageway between two buildings. Maintenance men complained about having to climb through a window to connect and disconnect the cars. The safety engineer investigated, found the complaint justified and found also that if a man got acid on him he would have to climb back through the window to get to the safety shower. An order was issued that a door be installed. The order was approved by the plant engineer, but a few days later it was rejected by the plant superintendent and the vice president. The vice president said he was just backing up the plant superintendent and would approve the order if the superin-


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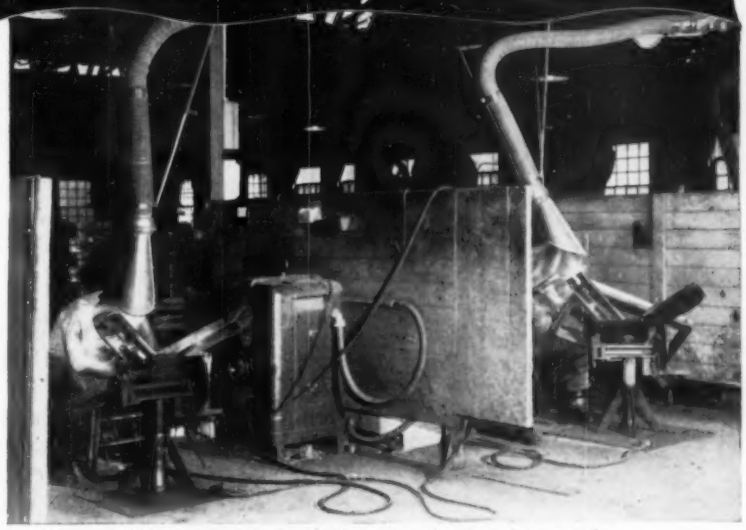

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tendent did. After an extended discussion, which became very heated, the safety man left the superintendent's office telling him then and later telling the vice president that he was going to keep the rejected order until someone got burned, then remind them of it. About two months later, the safety man received a call from the V. P. telling him he thought that the superintendent would now approve the order for a door. The safety man asked who got burned and was told that a labor representative had been doused with acid. You might say that was not the plant engineer's fault. He agreed fully with the safety man on the hazard and approved the order, but he made no effort to get the superintendent to change his rejection to an approval. Actually, the plant engineer did not fully live up to the "Canons."

### Plant Engineer Fired

A hazardous conveyor was being installed. Because it would have cost quite a lot of money, the plant engineer would not accept a recommendation to guard it. Six months later, during the night a man's arm was torn from his shoulder. The plant superintendent was at the home of the executive vice president when he received the message, and both came to the plant immediately. Construction of a guard was under way within two hours. The plant engineer was fired when he arrived at the office.

Maintenance men were repairing a machine. The guard had to be removed to do the work. It was not replaced and a pool of oil was left on the floor. The machine was put back into operation, a production employee stepped into the oil and fell against the machine. By the time it could be stopped, his arm had been ground off, by the gears, to a point above the elbow.

One of my pet gripes about maintenance men is their failure to replace guards and the failure to clean up the area before turning the equipment back to production.

Maintenance men are exposed to a lot of hazards and often have to work under very bad conditions. In many organizations, they suffer a very high percentage of the accidents, but often this is not the result of the conditions under which they work. The use of an improper ladder or the improper use of a ladder results in many accidents. Then, there is the failure to wear goggles when grinding, chipping or performing other duties that create eye hazards. The use of worn, mushroomed or other improper tools takes a heavy toll. Unsafe practices, such as standing on a pipe instead of a ladder, or riding on crane buckets, add to the injuries. These are only a few of the causes of accidents to maintenance workmen. Most of these causes are preventable, and it is the duty of the plant engineer to see that his maintenance crews perform their work in such a way as to prevent accidents to themselves and others.

There has been no intention of picking on plant engineers. As previously stated, I have usually found them co-operative and splendid men to work with. They have given me a tremendous amount of assistance over the past quarter century.

The purpose of these remarks is to point out the important part the plant engineer has in the safety program, to cite some examples of what can happen when a plant engineer either wantonly or unintentionally fails to live up to his responsibilities, and thus to stimulate his further consideration of this important phase of his duties.

From an address presented before the Plant Engineer's Society of Baltimore.
Picture by courtesy of "Shell News."

## Sign Up for Safety

An excellent example of how industry is making use of large changeable copy panels to promote a safety program is the installation at Standard Oil's Toledo, Ohio plant.

The installation is 15 feet long and the copy, which is formed with 8-inch green and 4-inch blue plastic letters, is changed regularly. In addition to carrying the safety record, topical announcements or safety slogans are also used. Employees are encouraged to submit their safety slogan suggestions.

Pictures by courtesy of Wagner Sign Service, Inc.

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## International Look at Safety in Mines

ALMOST EVERY DAY, in some part of the world, young men and women board a plane, ship or train, to study abroad under fellowships granted by the United Nations and the Specialized Agencies associated with it. Last year, more than 2,000 fellowships and study grants were awarded. Sixty nations have benefited from the program.

Are the fellowships useful? Do the fellows take back to their countries any new and useful knowledge or skill?

Yngve Hagerman of Sweden provides one answer. He was sent by the International Labor Organization on a 6-months fellowship to France, Germany, Canada and the United States. His subject, important to his country, was safety in rock blasting. Because of granite rock formation, the Swedes can do little construction or mining work without using blasting methods.

After a short period of "briefing" at the ILO headquarters in Geneva, he spent 3 weeks each in France, Germany, and Canada and 3 months in the United States. He met nearly a thousand people in the four countries directly concerned with industrial safety problems, visited Government offices, research institutes, industrial safety associations, mines, plants manufacturing protective equipment and so forth.

Hagerman reports:

"In all the four countries I was able to collect information that was interesting and valuable to me."

As Chief of the Mining Department of the Swedish Workers' Protection Board, Hagerman has definite responsibilities in the prevention of mining and tunnelling accidents. "For the past two years, I have been working on a draft code of blasting rules," he declared. "I noted many new points in French, German, Canadian and U. S. safety rules which could be put to very good use in improving and completing the draft."

"I also collected many new angles with regard to safety in hoisting," he said. "There are problems such as whether the safety factor of wire and rope should vary according to the depth of the mine. I found that in Germany they have evolved a formula for this dependence. Also in Canada."

In all 4 countries he was given the opportunity of seeing the latest safety measures. Some were so recent that draft rules with regard to them have not yet been published.

In Germany, he was given the latest draft for the testing of protective equipment. In the U. S. he was shown the newest developments in roof support and roof bolting. "The U. S. have a lead in this field. I got particularly interesting information at the roof-testing laboratory set up by the U. S. Bureau of Mines, outside Washington."

*(Continued on page 46)*

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MACHINE GUARDING SERIES
other articles August & September

By G. E. HARPER, Safety Supervisor
Large Steam Turbine-Generator Department
General Electric Company, Schenectady, N. Y.

# MAKING GRINDING WHEELS BEHAVE!

MACHINE GUARDS, safety regulations, safety education and careful supervision will prevent many industrial accidents, but they are not always sufficient to combat the most perplexing and unpredictable factor in safety engineering . . . the human element.

The most efficient machine guard ever devised is absolutely worthless if an operator, for some reason that even he cannot explain, places his hand inside the guard and has his fingers amputated.

Can we save a man's eyes . . . can we prevent facial disfigurement . . . can we prevent a fatal accident . . . by marking every grinding wheel with its safe operating speed and establishing mandatory rules covering its use . . . if an operator ignores the information and operates the wheel far above maximum tested speed?

Many serious injuries have been caused by broken grinding wheels. Some have resulted in permanent disability, some have resulted in even more serious consequences, and these accidents are going to continue unless some action beyond ordinary safety procedure is taken.

It should be emphasized that it is comparatively rare that responsibility for these injuries can be placed upon the manufacturer of the grinding wheels. It is doubtful if any other group of manufacturers uses greater care or exerts more effort to make a safe and dependable product that can be used with absolute confidence under the most rigid requirements of modern industrial production . . . if the wheels are used to do the work for which they were designed . . . and at the safe speed for which they were constructed.

Misuse them, operate them at speeds which exceed even the safety factor that is built into every wheel, and the wheels will react no differently than any other fine product under similar circumstances.

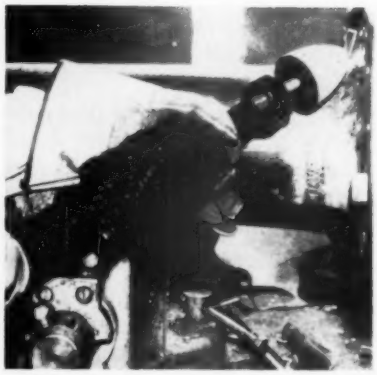
## Terrific Force

A grinding wheel that has disintegrated because of excessive speed becomes a terrible menace to everyone in the path of its flying segments. Have you ever considered the terrific speed and force involved?

When 3, 4, 6, or 7 inch resin-bonded wheels are operated at the maximum speed recommended by the manufacturer in accordance with ASA safety codes, they have a surface speed of 9500 feet per minute. That's 1.8 miles per minute or 108 miles per hour.

Now if we increase the speed of the same wheels by 50%, which is the minimum safety factor used by most manufacturers, they have a surface speed of 2.7 miles per minute or 162 miles per hour. However, ***the centrifugal force,*** that force which tends to rupture a wheel when overspeeding, ***has been increased about 141%*** although the wheel speed has been increased only 50%.

## If this is right. . .



For example, a few months ago an experienced operator started work as usual. He checked the blueprint of the job, set up his machine, attached a grinding unit, took a 4 inch wheel from his bench, and without checking it tightened the wheel on the shaft. He checked the

measurements once more, then started the machine.

Less than two minutes later he was lying on the floor unconscious. He remained unconscious several hours, was in the hospital several weeks, and even now has not fully recovered from the terrible impact of the grinding wheel fragment that struck directly over his heart. He had operated a wheel rated for 4500 rpm at a speed of 15,000 revolutions per minute. The doctor who treated the man said that in all probability the only thing that saved his life was the fact that the piece of the wheel first tore through his canvas coat, the top of his overalls, cut completely through a full package of cigarettes in his shirt pocket, and finally stopped against the back cover of a pack of book matches. The doctor believes that had the force not been retarded by the materials through which the wheel passed, it would have entered the man's body, with probably fatal results.

Other accidents from this same cause illustrate the extreme hazard that is presented. One man had the hair shaved from his head by a 9000 rpm wheel he had operated at 17,000 rpm. A 6500 rmp wheel nicked the edge of a man's ear after having gone through a protective wall. It had been used on a 21,000 rpm grinder.

In each case it was established that the operator had been fully instructed in the proper use of wheels and grinders by supervision, a fact that was later verified by the operators.

What can be done to prevent this type of accident? How can we stop operators from using the wrong combination of wheel and grinder . . . operators who have been fully instructed in correct methods . . . operators who sheepishly admit that they are fully aware of their mistake, but can give no reasonable explanation for their act?

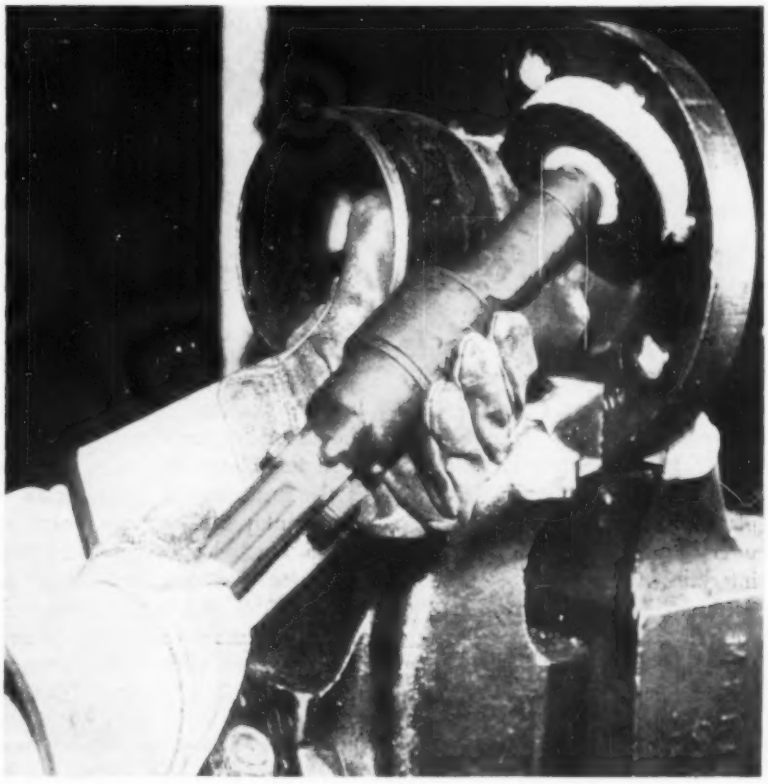
In combating grinding wheel accidents caused by excessive speed we have made color a policeman to help enforce the rules.

All grinding wheels were grouped according to maximum safe speeds and each group is given a distinguishing color. The grinders upon which the wheels can be safely used are painted the same color as the wheels. Thus only red wheels can be used on a red grinder, yellow wheels on yellow grinders, and so on. It is very easy for anyone to spot a yellow wheel being used on a red grinder, or whatever wrong color combination might exist, and stop the operation at once until the proper wheel had been secured.

Through discussion at round table conferences, orientation meetings and posters, all workers in the areas where grinding operations are required are being informed of the personal hazard from broken wheels not only to themselves but also to their co-workers. It is only necessary for a grinder to start work with the wrong colored wheel and someone, operator, fellow worker or supervisor,

## and this is too. . .WHAT'S WRONG HERE?

Let's look at the mathematical data for this particular accident. At its rated speed of 4500 rpm the wheel would have had a surface speed of 53.6 miles per hour, and would have developed a centrifugal force of 1,436 pounds, but when the speed was accelerated to 15,000 rpm, the surface speed was increased to 179 miles per hour, and the centrifugal force increased to 16,000 pounds. That's 8 tons! It's a miracle that the man is alive.



loses no time in correcting the situation.

Perhaps we have not completely eliminated the problem . . . anymore than any safety hazard can be solved 100% when the human factor is involved. But I do believe that we have taken a very long step in the right direction.

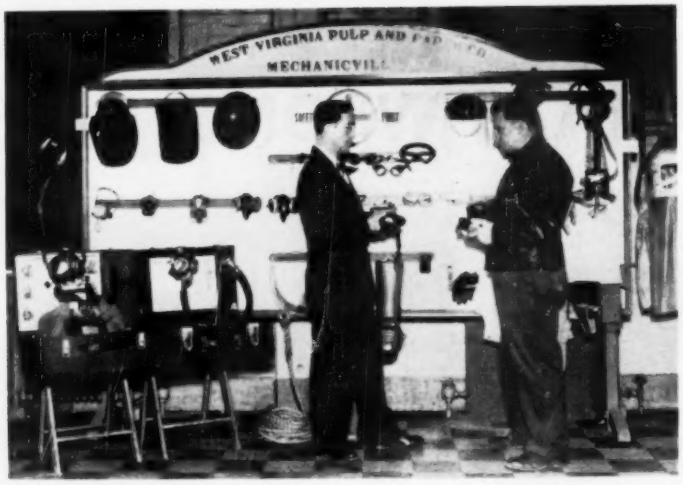
The color code we have devised has been established entirely to combat the unexplainable action of employees who place themselves and their associates in serious jeopardy by using wheels at excessive speeds in spite of all instructions . . . and in spite of the great care taken by the manufacturer to indicate the correct speed on each wheel.

Many of the manufacturers have already expressed their willingness to cooperate with us fully in this program. The color code has not been devised as a protection against a product, but rather for the protection of the user against himself. Experience has shown that the grinding wheel is a product that can be used with absolute confidence by any operator if he will use it properly. We are guarding the operator from his own limitations and not from the limitations of the wheel.

From an address presented at the 24th Greater New York Safety Convention.

Pictures by courtesy of Large Steam Turbine-Generator Dept., General Electric Co.

## "Safety Maintenance" Salutes . . . A SAFETY IDEA




### How About an In-Plant Safety Show?

AT WEST VIRGINIA Pulp and Paper Company's Mechanicville (N. Y.) plant, Safety Director Edward A. Decelle puts this large display board of available safety equipment "on the road" at regular intervals, so that it visits each department of the mill. This "refresher" course helps remind employees of safety and contributes to the excellent safety record. In 1953 the company's accident frequency rate was less than 7 per million man-hours worked, a figure less than half the all-industry average.

In this photo, the safety director is demonstrating a respirator to a new employee. Other equipment on display includes oxygen breathing apparatus and gas masks, goggles, face shields, hard hats, welding helmets, gloves, aprons, safety shoes, hoods, sleeves, safety belts, foot and leg guards, etc.

Picture by courtesy of Mine Safety Appliances Co.

### International Mine

*(Continued from page 43)*

Hagerman was struck by the extent to which conditions vary in all the 4 countries and yet there was something to learn from each. France has old surface plants at her mines but very modern equipment underground. Germany has very modern research institutes and a large number of them. Due to wartime destruction, her mining plant is new. In Canada, he visited a mining region which was all rock and where conditions were therefore comparable to those in Sweden. The cages and shafts were better arranged than in Sweden. The Canadians have made advances in rope and safety-catch testing.

In the United States, with its vast mining industry, he had an opportunity of seeing every kind of mine. Conditions and safety rules varied from state to state. "Generally, in the U. S. they are more advanced with regard to protective equipment than we are," he says.

There was one problem in which Hagerman had been particularly interested when he left Sweden—the danger of premature detonation of charges by lightning, radio frequency energies, and so forth.

Hagerman said that in France an apparatus had been developed "to know when lightning is coming, from a distance." The French also have developed interesting measures against "stray currents." (Stray currents, leaking out from electric locomotives, through the rails and into iron mines, could explode electric detonators.)

He found the Canadians have made investigations into radio frequency risks. In the U. S., a blaster's handbook has been published giving minimum distances over which there was danger of radio waves setting off premature explosions.

Hagerman thinks the answer to the problem may lie in non-electrical "short delay blasting" in use in Germany and the United States. It is done with specially devised connectors and obviates both the use of the old fashioned fuse and the modern electrical detonators.

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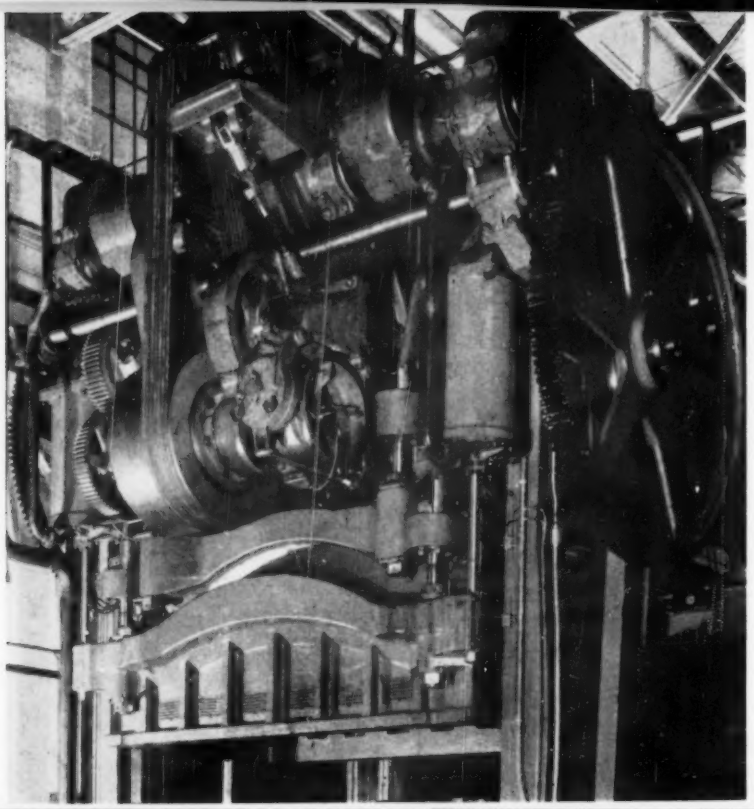

# What You Must Know To Guard a Machine

# PART II

*This article is continued from the September issue. In the first installment Mr. Montgomery enumerated seven of the eleven principles of machine guarding. They are:*

*1. Inevitability: If dangerous machinery is used unguarded, an injury-producing accident will inevitably occur.*

*2. Intrinsic Danger: Certain machinery parts are intrinsically dangerous and will cause accidents.*

*3. Non-Reliance: Employees cannot be relied on to avoid parts that are intrinsically dangerous.*

*4. Elimination: Dangerous parts must be eliminated through construction or by secure guarding.*

*5. No-Risk & Non-Use: If a machine is dangerous in any respect, it must not be used until rendered safe by reconstruction or guarding.*

*6. Safety Training: Unsafe acts of personnel must be prevented by thorough training in safe practices.*

*7. Production Safety Efficiency: Production efficiency depends on safety efficiency.*

By WALTER E. MONTGOMERY
Safety Director
Kenneth D. T. Robertson Ltd.

SEVEN METHODS of guarding dangerous parts are:

1. Guarding by construction of machine.
2. Guarding by positioning of dangerous parts so that they cannot be reached.
3. The use of a fixed guard.
4. The use of automatic guards.
5. The use of an interlock guard.
6. The use of a trip guard.
7. The use of a positional safety guard.

It will be seen that these 7 methods of guarding include 5 types of guarding. Often 2 or more types will be used together. On analysis, all known applications can be placed in one or the other of the principal classes. For instance the photo-electric ray method is merely an actuating device for trip type guards.

Although the principal types of guards are limited in number, the

*(Continued on page 52)*

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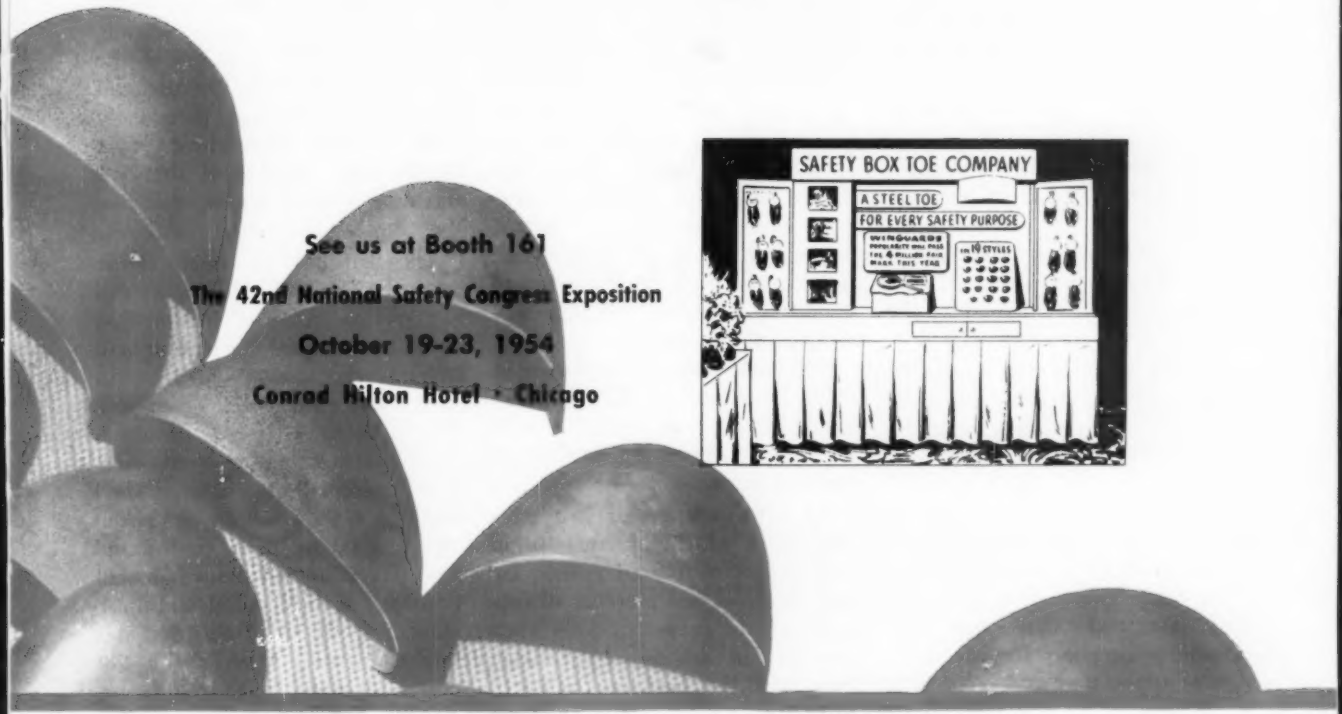

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various applications of them are unlimited. In this direction lies much scope for invention, ingenuity, and practical common sense.

In the design of guards for certain parts of machinery, such as gears, attention must be given to the provision of protection in the event the machines are reversed in motion.

This reversal might have the effect of transforming innocuous parts into dangerous ones and it has been legally held that machine parts must be securely guarded not only for the normal direction of working, but also when run in reverse.

From this comes the eighth principle of safeguarding: The Principle of Safeguarding for Reverse Motion: ***The design and fitting of any type of guard must be such that the dangerous parts are securely safeguarded not only for motion in the normal running way but also for their reverse motion.***

A little reflection will show that the essentials of guarding may be summed up as follows: Suitability for the purpose; strength to withstand circumstances of usage and process; construction to comply with any practical necessities, such as to give a clear view of the dangerous parts; minimal occasions for adjustments; the resistance to wear and tear; and, in certain cases, the approval of the operators.

A fixed guard is one which entirely encloses the dangerous parts of machinery to prevent all contacts from any direction and by any person with dangerous parts.

Furthermore, the legal implication is that a fixed guard should preferentially be used instead of any other type. There are provisions in some labor codes that specific permission is necessary for any deviation of application; and proof must be provided that the safety of a dangerous part cannot be secured by a fixed guard.

In effect, the position is that every effort should be made to render the use of a fixed guard possible.

The ninth principle is: The Principle of Priority of Use of a Fixed Guard: ***A fixed guard must always be the first preference for the safe-guarding of dangerous parts of machinery.*** If some redesign or re-arrangement of the machine parts would enable such a guard to be used then the necessary arrangements should be provided or redesign effected.

If a fixed guard cannot possibly be used, consideration should be given to another type. The choice is usually determined by the nature of the motion of the parts to be safeguarded.

**An automatic guard** is one in which a certain member, or combination of members, is worked automatically by the machine, so that as soon as the dangerous parts are set in motion the said member or members proceed to remove the operator out of danger.

It is essential that the part of the guard which is designed to remove the operator from danger must be actuated by a moving portion of the machine itself, preferably at an enhanced rate and with a lead in advance of the travel of the dangerous parts. In practice the imposition of severe acceleration stresses on the guard linkwork leads to excessive wear and may destroy the required critical adjustments. Accordingly, the automatic guard should be used only on slow running machines.

However, we should not lose sight of the basic premise that even if an automatic guard is a good one its use is not justified if a fixed guard can be used instead.

**An interlock guard** is a movable guard which, by itself, or in conjunction with fixed guards, entirely encloses and prevents all contact with the dangerous parts when they are in motion. Interlocking means that the guard is so connected or arranged with the operating switch (a) that the dangerous parts cannot be started until the guard is in place, and (b) the guard cannot be made inoperative until the operation has stopped and the danger eliminated.

**A trip guard** is a device that stops a machine before a near approach can be made to the dangerous parts. It consists of a mechanism that cuts off driving power and simultaneously applies a brake. The tripping mechanism must be so placed as to operate immediately if the operator creates a personally hazardous exposure. This type of a guard is commonly used on rubber mills, in gathering rolls, laundry calenders, paper machinery and so forth.

**The positional safety guard** consists of fixed members which are placed at such a distance from, and in safe relation to, the dangerous parts, that access to them, when they are in motion, is not possible. This is the last line of defense in the safety problem and should be used only when no other type of a guard can be adopted.

Having knowledge of numerous and varied methods of protection, all with various degrees of merit, the necessity for guard revision can be expressed in the tenth principle of guarding: The Principle of the Best Guard Known: The standard of any guard for any particularly dangerous parts of machinery in a factory must be that of the best and most efficient guard known in the country as a whole.

The chance of an unsafe act at certain machines depends upon, and will vary according to, the method of control adopted for starting and stopping the motion of dangerous parts. The greatest risk of an accident is in those operations which require constant and close coordination between the brain, hands, and feet such as the operating of a power press, set up for pedal control and hard placed stock. Such equipment is subject to mechanical maladjustments and wear and tear that will eventually cause a press to be a repeater. Careful maintenance reduces this risk; but unseen faults may develop in such a way that they are not disclosed by periodic examinations.

Logically, for absolute safety, it is necessary for the operator to withdraw both hands before the press can be put in motion. This

means that both hands should be used to operate the controls, which should be so arranged that they must be moved independently of each other, yet be so interlocked as to ensure that both must be used. Pedal control is definitely dangerous because of the risk of un-co-ordinate action of foot and hands.

The same reasoning is applicable to other machines fed by hand and leads to the eleventh principle: The Principle of the Two-Hand Control: ***Where the hands of the operator are necessarily placed between dangerous parts of a machine when the latter are at rest then, in addition to the requisite fitting of a suitable guard, the starting controls must be so designed as to require the operator to remove both hands from the danger area and use them to manipulate separate control devices, which must be independent in action but complementary in effect.***

For absolute safety, pedal controls should be replaced by two hand devices which should be designed to prevent misuse. Where more than one operator is employed on the same machine, multi-control is essential.

There are four essential requirements for establishing a satisfactory safety program. The first is for managements, through their safety departments, to possess a knowledge of those parts of machinery that produce accidents. The second is to know how best to safeguard those parts. The third is to ensure that all persons employed are educated and trained in safe practices. The fourth is to revise continually the standards of guarding in conformity with the latest practice.

It is too much to expect that this scientific approach will be universally adopted overnight. Even to make the large majority of manufacturers aware that such an approach is possible will need much hard work on the part of safety engineers. But, sooner or later, these principles will be accepted even by those who, at present, may be inclined to consider them academic and idealistic.

From an address presented at the National Safety Congress.


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(For details, use Key # X-33 on card on page 99)

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(For details, use Key # X-34 on card on page 99)

## Dry Chemical Knocks Out Spectacular Fires

DRY CHEMICAL FIRE equipment recently accounted for spectacular put-outs of 2 separate fires in a gasoline line in Maryland and a ruptured gas main in Pennsylvania, according to Ansul Chemical Company.

The gasoline line fire occurred at the Esso Refinery in Baltimore, when the fuel, spilling out of a break in a 4-inch line, was ignited by a spark from a welder's torch. The flames were 40 feet high when Fire Marshal Fielder Hiss arrived in a jeep mounting 350 pounds of dry powder. Hiss knocked the blaze out in 2 minutes, the report indicates.

The gas main fire broke out near the eastern end of the Pennsylvania Turnpike, when a faulty warning lantern on a construction project ignited escaping gas. The King of Prussia, Pa., volunteer fire company, led by Chief John Brennan, sped to the scene in a truck mounting a 350-pound stationary unit, and quickly extinguished the fire.

## Fire Instructors Meet

THE SIXTH ANNUAL County Fire Instructors Conference is being held in Rochester, New York, October 10–15, 1954. According to Thomas W. Ryan, Director of the New York State Division of Safety, 76 instructors from counties throughout the state are expected.

Arrangements for the 5-day training session are under the supervision of B. Richter Townsend, Chief of the Division's Bureau of Fire Mobilization and Control. At present the bureau sponsors 2 courses for firemen—an elementary course in firemanship consisting of Basic, Intermediate and Advanced, and a graduate course in Single Company Operations. At the October Conference, six additional graduate courses will be studied and developed through the combined efforts of the Fire Bureau staff and County Fire Instructors in attendance. Among the graduate courses being considered are Pump Operator, Grass and Brush Fire Fighting, Fire Inspection, Fire Service Rescue, Fire Company Leadership and Fire Report Writing.

## July Fire Losses

ESTIMATED FIRE losses in the United States during July amounted to $69,532,000, according to the National Board of Fire Underwriters. This loss represents a decrease of 7.2 percent from losses reported for July, 1953, and an increase of 6.1 percent over losses for June, 1954.

Totals for the first seven months of 1954 are now $525,522,000 an increase of 3.7 percent over the first seven months of 1953. These estimated insured losses include an allowance for uninsured and unreported losses.

## Firemen Learn While House Burns

HOW DO YOU BURN down a house—assuming you have the opportunity (and the legal title) to do so? Here's how the Muskegon, Mich. Fire Department, assisted by technical experts from the local mill of Anaconda Wire & Cable Co. did it, attempting to learn as much as possible about heat, and flame, and the attendant poisonous gases; about fire control; and about the most effective, efficient ways to use their fire-fighting equipment including some of the newer techniques, such as the effectiveness of fine water spray from fog nozzles, read or heard about but still untried.

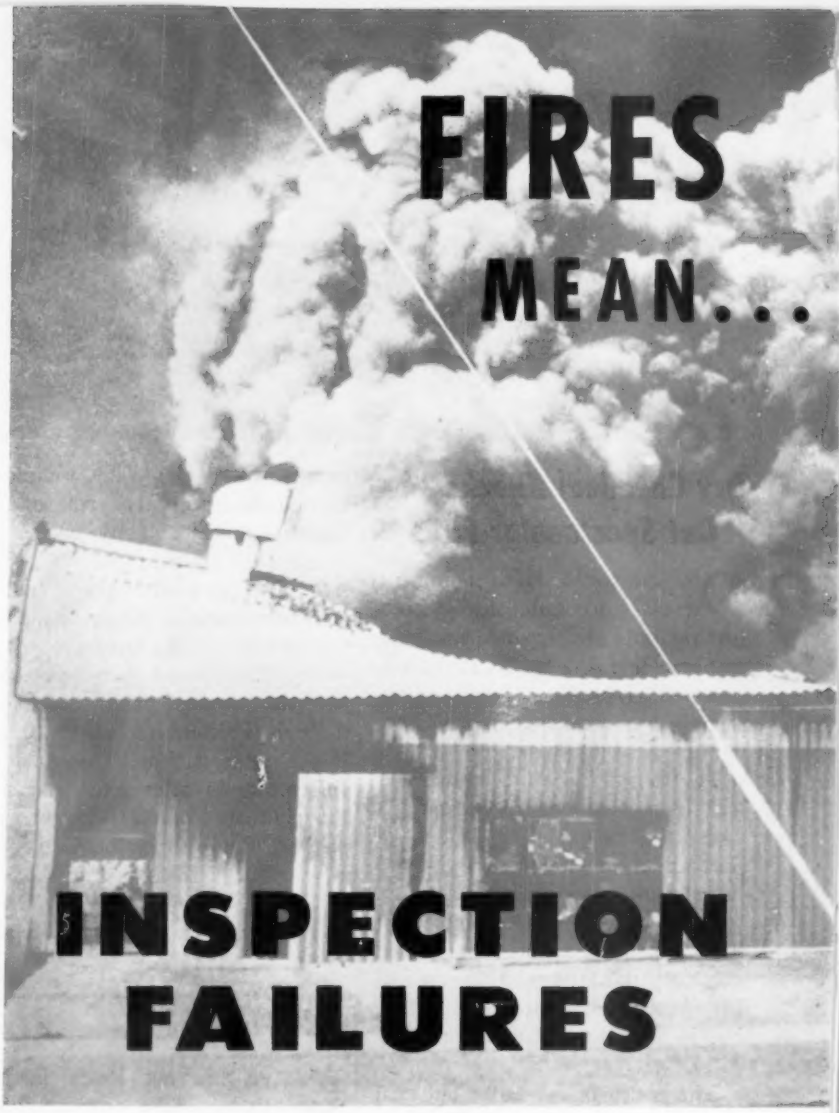
First, the five rooms in a brick veneer house, condemned for an express highway, were wired with thermocouple wire. This was led outdoors and terminated at a control box some distance from the house. A pyrometer was then so arranged that it could be switched rapidly to the thermocouple wires from any of the rooms to record the temperatures during the tests. (The object here was to learn, by exact measurement normally denied to fire-fighters, the actual temperatures in separate rooms during various stages of attack by heat and flame.) Then three separate tests were run off.

A single room was set afire. It was allowed to burn until the temperature in the room reached 1325 degrees. The men on the hoses moved quickly into the house, into the burning room, and the water sprayed out of the nozzles in a fine fog. Only 28 gallons of water were sprayed before the signal was given to indicate the temperature had been lowered enough for the firemen to move in close with regular nozzles, pouring water directly at the flames. Eight more gallons of water were poured into the burning room. In just 31 seconds the temperature had dropped to 125 degrees.

*(Continued on page 58)*

By ALAN L. KLING
Assistant Director
Safety and Fire Prevention
American Cyanamid Company

# FIRES MEAN... INSPECTION FAILURES



TWO NEW RECORDS were established last year. First, the total annual fire loss was greater than at any time in history; and second, there occurred the largest single industrial fire on record. The trend and the magnitude of losses is such that it demands a critical reappraisal of current fire safety methods.

Industrial technology has changed vastly over a short span of years. Processes are more complex than ever before; new products and new hazards are constantly being introduced; the trend in modern construction is toward increasingly large open fire areas; and there are frequent changes in operations and personnel.

It might seem that the advance of fire protective devices and procedures has lagged—that industry has created hazards and unsafe operations faster than it developed methods to control them. A comprehensive review of industrial fires and the analysis of their causes clearly indicates that adequate protective means were available, but they were either not used or they failed to function properly.

**Design & Construction** for fire safety is where fire inspection actually begins.

Since proper methods of protection do not appear to be lacking the question naturally follows: Are present inspection procedures inadequate?

It becomes apparent at once that the common concept and meaning of the term "inspection" must be broadened. Too often this type of an assignment is considered to be merely the routine checking of physical equipment—such items as valves, sprinklers, extinguishers—with the usual "look around" to see that things are generally in their normal condition.

Inspection must be more than this—it must be the active anticipation of all accidents—and as such, it is in many respects synonymous with a total program of fire prevention and protection. Inspection must precede the construction of a plant, and must continue until all operations cease.

### Built-in Protection

Where then does inspection start? Actually, it begins with the earliest idea of the research division and with each preliminary sketch of the design engineer. There must be, however, something concrete, something tangible, around

FIRE PROTECTION SERIES
next article in November

which to base an initial fire safety discussion.

Flow sheets of proposed processes provide such a reference point. These can be simple or complex; a mere listing of materials and conversion steps or a detailed operational lay-out with line sketches of the processing equipment. At this stage it is possible to explain and emphasize the need for fire safety consciousness all during the development, and to point out specifically many of the items that will be required later—such as proper building construction, fire walls and cut-offs, sufficient water supplies, automatic sprinkler protection, explosion vents, flash arrestors, grounding, etc.

During the engineering, when the plant is being built and operated on paper, there should be frequent inspection of the drawings and specifications to make certain that buildings are properly located, that unnecessary hazards are eliminated and that adequate protection is being provided. In multiplant operations it is desirable to have a central coordinating office review all proposals to ensure adherence to over-all company standards. At this point it is advisable to obtain approval of the insurance underwriters as well, and it is common practice to have a final review meeting attended by insurance representatives, project engineers, operating personnel and fire and safety specialists.

When construction begins, inspection moves into the field, but previous to this there must be a definite understanding by the contractor that he will observe the company's fire and safety regulations. These may be restrictive and the contractor should be warned of any limitations before he submits his bid. In the formal contract there is usually a general statement requiring compliance with all company fire and safety rules. There should be, in addition, a detailed description of the hazards and the required precautions. If this list is specific, if its significance is understood and appreciated before bidding, and if it is reviewed in detail before the actual start of the work, the inspector will usually have little difficulty in obtaining cooperation. A contractor is vitally interested in getting a job done quickly for the least expenditure of money, but reputable contracting firms are also interested in future jobs. If they have trouble with the fire and safety inspectors, their chances for a return engagement are greatly reduced. A definite procedure for advising the contractor of hazards in his work area before he bids, and regular, thorough inspections of the job site will do much to reduce costly construction fires.

### Operating Precautions

After a plant has been built, or a new process installed, it is essential that detailed operating instructions be prepared. These should contain a description of all the inherent hazards and the required safety precautions. Inspection here consists of making certain that the procedures are always available to the operators and not lost in the back of some desk drawer or gathering dust on a shelf; that there is frequent review by qualified operating, supervision and technical personnel; that dangerous short-cuts have not been introduced; that there is understanding of the instructions by the operating group; but above all, that there is appreciation of their significance and importance. If there isn't, disastrous fire will surely result.

In addition to general plant fire and safety rules, and operating in-

**Checking of ALL Fire Equipment** regularly is second factor in successful inspections.

**Definite Operating Procedures,** such as work permits for maintenance welding, and provision of fire equipment is part of inspector's job.

structions, it is often advisable to have specific rules for certain areas. These are especially useful in plants where there is a large turnover of labor, or where new maintenance men must be assigned work in an operating area. These special rules can be framed and located at the entrance of each building where they will be easily accessible for review. Inspection here is not mechanical checking—it is the somewhat intangible job of making certain that foremen properly instruct their men in the observance of fire safety rules.

### Work Permits

Many fires occur during normal maintenance work. To ensure adequate control, a system of Safety Work Permits is essential. This might be considered a self-inspection check list for operating personnel. It should cover the use of open flames, exposure to flammable, corrosive, or toxic materials, work performed under conditions of abnormal temperature, and the entering of all confined spaces. Plant personnel should so thoroughly respect the safe work permit system that they would immediately question any job they thought the least bit hazardous, and insist on a properly issued permit before starting work. Employees who appreciate that this procedure is for their own benefit, as well as to protect their jobs, will give the inspector no difficulty. For example, welders, who are probably the chief users of non-fixed open flames in our plants, will generally give excellent cooperation once they understand that if they start a fire with their torch, they themselves are usually the first to be destroyed by the flames. Not all jobs require permits, but those that do can be designated on the original maintenance work order.

In addition to the inspection of operations and maintenance from the standpoint of fire prevention, there is the equally important aspect of fire protection. When the plant was originally built, or new processes added, there were numerous fire protective devices installed. These are of value only if they are in proper operating condition and to make certain that they are, it is necessary to have an adequate inspection program. An inspection form or check list is essential. Too often a person charged with the responsibility of making certain that all fire protective equipment is in proper operating condition feels that he has an adequate mental check list and that he knows the location of every piece of equipment. Experience has shown that he will eventually miss one or two items. The inspection report should contain a list of main and divisional valves, sprinkler control points, hose houses, special extinguishing systems and all other equipment that is in any way connected with fire fighting operations. Equally as important as listing all of the equipment is having the inspections on a regular schedule.

Hazardous conditions observed during an inspection tour should be reported immediately by phone and then confirmed in writing. In multiplant operations a summary of the regular inspections should be prepared monthly and sent to top management for review.

If fires do occur, regardless of how small, there should be a complete investigation and thorough inspection. Actually, a fire represents a failure of one of the elements of production—either men, material or machines—and it also represents a failure somewhere in the inspection procedure. The preparation of a complete report is essential to help prevent a recurrence. It is somewhat like locking the barn door before the second horse is stolen.

### The Inspector Himself

In addition to forms and reports there is the equally important consideration of the inspector himself. Comprehensive inspection programs can be developed—the best in protective equipment can be installed—and the most complete check lists possible can be prepared—but inspectors are no better—no more reliable—than the persons making them are capable and conscientious. An inspector must be an instructor as well as an investigator and he must possess ability, integrity and a persistent curiosity. He must see what he looks at and understand what he sees.

Concentration on industrial inspection procedures and a better appreciation of the importance of the inspectors job will do much toward reversing the present fire loss trend.

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From an address presented at the 24th Greater New York Safety Convention.

Pictures by courtesy of: Top, Walter Kidde & Co., Inc.; Bottom, left and right, Grinnell Co., Inc.; far right, Eastman Kodak Co.

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### Firemen Learn

*(Continued from page 55)*

In the next test, three rooms were set on fire. They were allowed to burn until the temperature in the three averaged 1200 degrees. The firemen moved up then, and 35 gallons of fog were applied in half-a-minute, 13 gallons of direct streams were sent in in 11.5 seconds, and the temperature dropped to 150 degrees. Elapsed time: 41.5 seconds, with 48 gallons of water used in all.

The third test followed. In this one, all five rooms were touched off. The average temperature reached 1250 degrees, and the firemen moved in, first with fog, then with direct streams. For the entire house, 59 gallons of fog were applied in 51 seconds, then firemen used an additional 75 gallons in the next minute in direct streams to drop the temperature to 150 degrees. Total elapsed time: 111 seconds.

Fire Chief Wallace F. Gannon issued general conclusions about the use of fog nozzles. They accomplished, he said, four vital things: 1. There is less fire travel. The introduction of fog into a burning room immediately stops its spread. 2. Firemen are "punished" less by the fire hazard, since the temperatures drop so rapidly. 3. Fog allows much quicker rescue of persons trapped in the burning building. It can be concentrated on the rescue area until the person has been withdrawn to safety outside. 4. Use of fog greatly reduces fire damage, especially water damage. So little water is necessary, and no heavy streams cause force or pressure damage.

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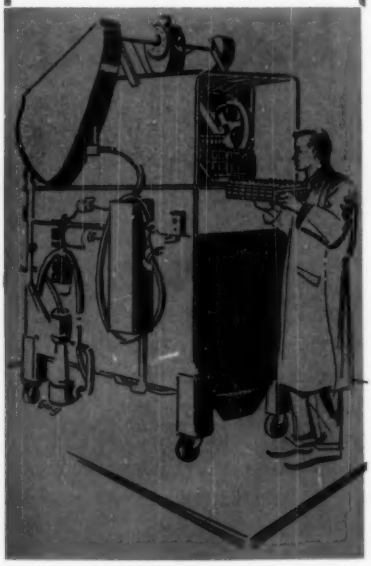
Get in touch with your local Ansul man through the "yellow pages" or write ANSUL CHEMICAL COMPANY, Fire Equipment Div., Dept. F-53, Marinette, Wisconsin.

(For details, use Key # X-35 on card on page 99)

SAFETY REQUIRES:

1. Approved equipment
2. Know the fire hazard of the cleaner or solvent
3. Take necessary precautions

# Clean Up Dry Cleaning and Degreasing Fires



By NORMAN H. DAVIS, Jr.
Executive Engineer
Underwriters' Laboratories, Inc.

BEFORE DISCUSSING cleaning liquids, one must first consider their use in dry-cleaning systems and the classification of these systems. Pamphlet No. 32 of the National Board of Fire Underwriters classifies dry-cleaning systems as follows:

*Class I*—Systems utilizing solvents having a fire-hazard rating above 40. This includes all systems utilizing solvents such as gasoline or naphtha or that are "classed between kerosene and alcohol (ethyl)."

*Class II*—Systems utilizing solvents having a fire-hazard rating of 40 or below, which do not fall within the definitions of Class III or Class IV systems. This includes all systems utilizing safety solvents "classed with kerosene," also systems utilizing solvents "classed with paraffin oil" and those "classed between paraffin oil and kerosene" if either the equipment or the solvent is not as specified under the definition of Class III systems.

*Class III*—Systems employing cleaning and drying equipment listed by Underwriters' Laboratories, Inc. for use with solvents having a fire-hazard rating not over 25 and having other specified characteristics including a minimum flash point (closed cup) of 138.2 F. The solvents must be listed by Underwriters' Laboratories, Inc. as complying with such specifications and as suitable for use in such cleaning and dry-cleaning equipment. These solvents are "classed between paraffin oil and kerosene"; they are sometimes called "140 F. solvents."

*Class IV*—Systems utilizing solvents "classed as nonflammable" or "classed as nonflammable at ordinary temperatures and only slightly flammable at higher temperatures" (fire-hazard rating not over 5 according to Underwriters' Laboratories, Inc.'s schedule for the classification of the hazards of liquids).

Now that we have the classifications of the dry cleaning equipment, let us discuss the liquids used in this equipment.

## Cleaning Liquids

Although many flammable liquids differ widely from each other both in respect to fire hazard and chemical composition, they have in common certain chemical and physical properties which constitute their fire hazard. These common properties vary in fairly close proportion to the fire hazard of the liquid.

Underwriters' Laboratories has therefore worked out a method to measure and correlate the most important hazardous properties of various liquids in terms of well-known liquids, such as gasoline, kerosene, and paraffin oil, the hazards of which have been well established by field experience. The method embraces a general classification as well as a numerical scale of hazard ranging from zero to 100 plus, as shown in Table 1 below. The listing of these materials may be found in Underwriters' Labora-

**TABLE 1. Fire Rating Classification**

| General Classification | Numerical Scale |
|---|---|
| Ether class | 100–110 |
| Note: Pure ether is rated 100. | |
| Gasoline class | 90–100 |
| Kerosene class | 30–40 |
| Note: A standard kerosene 100 F. (closed cup) is rated 40. | |
| Paraffin oil class | 10–20 |
| Note: A paraffin oil of 440 F. flash (closed cup) is rated 10. | |

tories' Gas and Oil Equipment List. They are classed in respect to fire hazard with the well-known products shown in Table 1, and given a corresponding numerical value. (See Table 2).

### Containers Marked

The containers in which all these various liquids are bought from a store are usually marked, when the liquid is flammable, with such words as "flammable" or "keep away from flame." If the liquid is listed by Underwriters' Laboratories, the marking generally includes the classification. These words, however, may be in small print and not noticed by the user, or in some cases there may be failure to understand what these words really mean.

### Vaporizes in Air

When a container of liquid is marked "flammable" or "keep away from flame" it means that the liquid gives off flammable vapors at ordinary room temperature. Whenever a can or bottle of such a liquid is opened, vapors begin to come out the opening; and when the liquid is spread or rubbed over a surface as paint or as cleaning liquid, the vapors come off much more rapidly. These vapors usually cannot be seen, but as they flow or diffuse away from the surface, they mix with the air and may form a mixture with air that will burn or explode when ignited by any spark or flame.

### Fluids & Precautions

Cleaning fluids which do not present a flammable vapor hazard can often be used in place of those which have this hazard. Cleaning fluids having a numerical scale rating less than 40 are in the "kerosene" class or below, and are viewed as not presenting a flammable vapor hazard at ordinary room temperatures. It is desirable to use the nonhazardous materials where possible.

Where flammable cleaning liquids are used, the fundamental safety precautions are briefly as follows:

1. Provide good ventilation to carry away the vapors.

2. Keep all flames, sparks, and hot surfaces well away from the work.

The importance of these precautions has been shown in many fires. In one case a young couple used gasoline to clean a waxed floor. The vapors became ignited causing a fire which sent the young couple to the hospital badly burned, killed their baby and burned down their home. A pilot light on a gas range, operation of a light switch or striking of a match are a few of the various ways in which the fumes might have been ignited.

### Degreasing Solvents

Degreasing of materials such as wool, cotton, etc. with naphtha should be in a detached one-story building. The following safeguards should be strictly enforced when using this method of degreasing:

## Table 2. Fire Ratings of Common Liquids

| Liquid | Purity | Flash Point | | Apparent Ignition Temperature | | Classification | Numerical Scale |
|---|---|---|---|---|---|---|---|
| | | Deg C | Deg F | Deg C | Deg F | | |
| Acetone | C.P. | —16 | 3 | 538-566 | 1000-1050 | Gasoline | 90 |
| Acetate, Amyl | Pure | 25 | 77 | 399-427 | 750- 800 | ..... | 55-60 |
| Acetate, Butyl, Normal | C.P. | 29 | 84 | 371-440 | 700- 825 | | |
| Acetate, Ethyl | C.P. | —2 | 28 | 427-496 | 800- 925 | | |
| Acetate, Methyl | Anhydrous | —10 | 14 | 454-496 | 850- 925 | | |
| Acetic Acid, Glacial | 99.5 | 42 | 107 | 427-496 | 800- 925 | | |
| Acetic Anhydride | C.P. | 53 | 127 | 315-357 | 600- 675 | | |
| Alcohol, Amyl (Fusel Oil) | Technical | 38 | 100 | 371-385 | 700- 725 | Kerosene | 40 |
| Alcohol, Amyl Sec. | Technical | 24 | 94 | 343-385 | 650- 725 | | |
| Alcohol, Amyl Iso | ..... | .. | 114 | 343-385 | 650- 725 | Kerosene | 35-40 |
| Alcohol, Butyl Iso | 106-108F B.P. | 31 | 88 | 371-427 | 700- 800 | | |
| Alcohol, Butyl Normal | 116-118F B.P. | 38 | 100 | 343-385 | 650- 725 | Kerosene | 40 |
| Alcohol, Denatured | Formula No. 1 | 16 | 61 | 399-432 | 750- 810 | Ethyl Alcohol | |
| Alcohol, Ethyl | Absolute | 12 | 54 | 371-427 | 700- 800 | ..... | 70 |
| Alcohol, Methyl | C.P. | 11 | 52 | 427-482 | 800- 900 | | |
| Alcohol, Propyl Iso | 81.5-82.1F, B.P. | 16 | 61 | 399-454 | 750- 850 | Ethyl Alcohol | 70 |
| Alcohol, Propyl Normal | 96-98F B.P. | 25 | 77 | 371-427 | 700- 800 | Amyl Acetate | 55-60 |
| Aniline | C.P. | 84 | 183 | 538-607 | 1000-1025 | | |
| Aniline, Dimethyl | C.P. | 74 | 165 | 371-399 | 700- 750 | | |
| Benzol | C.P. | *—20 | *—4 | 538-571 | 1000-1060 | Gasoline. | 95-100 |
| Benzaldehyde | C.P. | 64 | 147 | 192 | 377 | | |
| Carbon Disulphide | C.P. | —30 | —22 | 100-106 | 212- 223 | ..... | 110+ |
| Cottonseed Oil | ..... | 252 | 486 | 343-427 | 650- 800 | Spon. Ignition** | |
| Ether, Ethyl | C.P. | —45 | —49 | 180 | 356 | ..... | 100 |
| Furfural | 54-55F B.P./17 mm. | 61 | 143 | 315-357 | 600- 675 | | |
| Gasoline | 74-76° A.P.I. | —43 | —45 | 280 | 536 | ..... | 95-100 |
| Glycerine | C.P. | 176 | 350 | 343-399 | 650- 750 | | |
| Hexane | From Petroleum | —26 | —15 | 260-296 | 500- 565 | Gasoline | 90-95 |
| Isoprene | ..... | —54 | —65.2 | 428 | 802.4 | | |
| Lard Oil | ..... | 184 | 363 | 343-399 | 650- 750 | | |
| Linseed Oil (Boiled) | ..... | 206 | 403 | 343-399 | 650- 750 | Spon. Ignition** | |
| Linseed Oil (Raw) | | 222 | 432 | 343-399 | 650- 750 | Spon. Ignition** | |
| Methyl Salicylate | U.S.P. | 104 | 219 | 454-510 | 850- 950 | | |
| Nitro Benzene | C.P. | 92 | 198 | 482-510 | 900- 950 | | |
| Olive Oil | ..... | 252 | 485 | 343-427 | 650- 800 | Spon. Ignition** | |
| Palm Oil | ..... | 162 | 323 | 315-371 | 600- 700 | Spon. Ignition** | |
| Petroleum Ether | 50-60F B.P. | —56 | —69 | 329 | 624 | Gasoline. | 95-100 |
| Pyridine | C.P. | 23 | 74 | 482-593 | 900-1100 | | |
| Toluene | C.P. | 9 | 48 | 566-607 | 1050-1125 | ..... | 75-80 |
| O-Toluidine | 83-85F B.P./15 mm. | 94 | 202 | 482-538 | 900-1000 | | |
| Xylene | 138-139F B.P. | 30 | 86 | 482-621 | 900-1150 | | |

* Subject to error of + or —5 degrees C.

** Note—These oils oxidize on exposure to the air, and when on fibrous material, such as cotton waste, may cause spontaneous ignition under favorable conditions.

ABBREVIATIONS: C. P.=Chemically Pure; B. P.=Boiling Point (closeness of range indicates degree of purity; A. P. I.=American Petroleum Institute.

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1. Smoking should be prohibited, and all open-flame or spark-producing devices eliminated.

2. Underwriters' Laboratories' labeled explosion-proof electrical equipment for Class I, Group D locations should be used.

3. Precautions should be taken against static electrical sparks.

4. Ventilation to eliminate flammable vapors either by natural or artificial means.

5. A supply of sand or other noncombustible material may be useful in cleaning up spills of flammable liquid, or to form dams.

## Metal Cleaning

Metal cleaning processes may be divided into five classifications:

*1. Solvent cleaning.* Nonflammable solvents, flammable solvents and emulsifiable cleaners. As indicated under the heading of cleaning liquids, those solvents having a flash point above 100 F or a numerical classification less than 40 are less hazardous.

*2. Vapor degreasing.* Trichloroethylene and perchlorethylene are practically nonflammable, and are most commonly used in this process. In the vapor degreasing process, it is important to keep the solvent clean and prevent overheating. The preferred type of equipment has a continuous recleaning still.

*3. Chemical cleaning.* In acid-cleaning processes, a hot, diluted solution of sulfuric, nitric or hydrochloric acid is commonly used, followed by successive hot alkaline and water rinses. Caustic soda, trisodium phosphate, sodium metasilicate or sodium sesquisilicate are quite widely used. They are cheap and no fire hazard is present although the usual care must be taken for handling caustic solutions. Electro cleaning produces a clean surface suitable for electro plating.

*4. Mechanical cleaning.* Blast tumbling and wire brushing.

*5. Heat cleaning.* Heat by torch or an oven or in some cases the work may be immersed in molten salts, to burn off oil deposits or to loosen rust or scale from metal parts in some operations.

Classification No. 2 above is probably the most popular, and, as mentioned, is practically nonflammable. However, it is very important that the solvent be kept clean and be prevented from overheating. Many fires have been caused by the vapors condensing on the materials in the basket and then dripping down carrying the grease with them. The trichloroethylene or perchlorethylene containing this grease becomes quite flammable unless it is distilled and the grease removed.

Underwriters' Laboratories' Gas and Oil Equipment List in addition to listing and classifying cleaning liquids also lists and classifies solvents. In addition, the Electrical Equipment List under the heading of "Industrial and Laboratory Heaters" lists several manufacturers of vapor degreasers. The listings of these vapor degreasers are qualified in that they may only be used with nonflammable and noncaustic listed cleaning liquids.

## Hidden Costs of Accidents

INDUSTRY IS PAYING out $400 in hidden costs for every $100 paid for insurance protection against industrial accidents, Bradford T. Blauvelt, vice-president and comptroller of Daystrom, Incorporated, told a conference of Daystrom safety executives recently. The conference represented the joining of forces of the company's top financial and human relations executives to place special emphasis on the importance of industrial safety.

Blauvelt urged the representatives of Daystrom's four operating units to "reexamine their safety programs to make them the most modern programs industry can offer" in reducing accidents and thus reduce both direct and indirect costs of accidents. He cited as such costs the wages paid to injured employees, wages paid for replacement employees, interrupted production schedules, and downtime of machinery.

"Reoccurrence of accidents and claims that can be prevented by proper safety education and training can easily jeopardize our assets and earning power," Blauvelt said. He pointed out that direct insurance costs alone for Daystrom amount to almost $200,000 annually.

### Selling Safety

Duncan J. Morgan, director of human relations, told the group that safety programs need more selling and merchandising to employees to assure peak interest and success. "The employee with the 'it can't happen to me' attitude is a psychological liability to himself and to his company," Morgan said. "Safety campaigns can succeed only when management uses the proper psychological tools to attain a true feeling of self-interest and pride in the program by every employee. Enthusiastic interest by every member of management is essential for this success."

---

## Effluent Air & Gas Cleaning Equipment

THE STUDY OF Effluent Air and Gas Cleaning Equipment has been announced as a new project for a national committee to be composed of representatives of many organizations. The committee will work under the procedures of the American Standards Association, to establish standards relating to the fundamentals of performance of effluent air and gas cleaning equipment or devices used for the treatment of substances flowing into the air.

---

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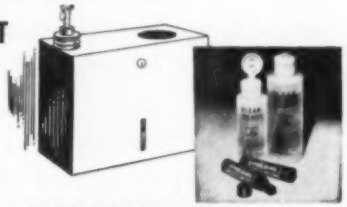

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# Industrial Hygiene

Associate Editor
Jacob A. Goldberg, A.M., Ph.D.

## Public Health Workers Meet

PUBLIC HEALTH WORKERS from all parts of the free world are putting their own profession under the microscope at the eighty-second annual meeting of the American Public Health Association and 38 related organizations in Buffalo, N. Y., October 11 to 15. More than 5,000 men and women—physicians, dentists, nurses, engineers, statisticians, veterinarians, sanitarians, nutritionists, health educators, entomologists, biologists and other specialists from federal, state, county and city health departments, voluntary health agencies and medical schools—are expected to attend the meetings.

Among phases of public health work being evaluated are school health, dental, nutritional and other health services for children; medical school training in preventive medicine; program budgeting practices; state laboratory programs; in-service training programs in mental health for public health nurses and health officers, and several phases of rehabilitation. Other features of the meetings are a progress report on lung cancer by a panel of leading researchers, including Dr. E. Cuyler Hammond of the American Cancer Society whose studies on relationship between cigarette smoking and lung cancer touched off the present controversy; reports on efforts to combat recent outbreaks of infectious hepatitis and other epidemics; latest results in immunization against poliomyelitis and other diseases, and reports on research in such widely varying phases of public health as air pollution, accident prevention and food sanitation.

## Air Pollution Conference

PRACTICAL ASPECTS of efficiency and cost, along with specific details on installations of many types of air pollution control devices will be presented at the Semi-Annual Technical Conference of the national Air Pollution Control Association scheduled for November 4, 5 and 6 in Los Angeles.

Industry-wide reports on control of air contaminants, using existing installations as illustrations, have been programmed, including problems of the steel, gray iron and non-ferrous metals industries, combustible and non-combustible waste disposal, vehicle exhausts, asphalt roofing plants, petroleum, and airborne radioactivity.

Persons attending the three-day event will find a pool of technical knowledge that will provide basic facts, not merely theory, on reduction of atmospheric contamination, Gordon P. Larson, president of the Association and director of the Los Angeles County Air Pollution Control District stated.

Convention chairman is William L. Stewart, Jr., executive vice-president of the Union Oil Company of California, while honorary chairman is John Anson Ford, chairman of the Los Angeles County Board of Supervisors. Dr. Arnold O. Beckman, president of Beckman Instruments, Inc., is technical program chairman.

Advance registration should be made through Edward S. Feldman, 2155 East Seventh Street, Los Angeles 23, California.

## Lost-Time Illnesses

YOUNG PERSONS LOSE more time from work because of illness than do older men and women, according to a recent survey among 1,190 married and 281 single employees of the Du Pont Company. In the 24–29 age bracket, 55 percent of all employees had a time-losing illness last year. Among those in the 36–40 bracket, only 33 percent had lost time, while in the 55–60 bracket it was 49 percent. In all groups, most missed less than a week.

*(Continued on page 68)*

FIRST AID SERIES
other articles November & December

# A medical specialist discusses . . .

# The Need for Proper Wound

By RAYMOND M. CURTIS, M.D.
Baltimore, Maryland

*The author, a graduate of the New York University College of Medicine, became interested in surgery of the hand during World War II, where he was the assistant chief of the Hand Service at the McCornick General Hospital, Pasadena, California, and the Letterman General Hospital, San Francisco. It was also during World War II that Dr. Curtis came in direct contact with Dr. Sterling Bunnell, who served as the civilian consultant for the rehabilitation of hand injuries for the armed services.*

*Dr. Curtis returned to Baltimore in 1947 and since that time has devoted himself almost exclusively to the rehabilitation of the injured hand. He serves as consultant in hand surgery to the Baltimore City Hospital, Children's Hospital School, Veterans' Hospital at Fort Howard, and the U. S. Public Health Service Hospital.*

TO ALL OF THOSE who deal with industrial accidents the importance of the injured hand is well known. In all the statistics which have been compiled by the National Safety Council and the individual compensation commissions, the largest number of injuries and the greatest expense has been incurred from hand injuries. Of all industrial accidents those of the wrist, hand and digits amount to over one-third in number and approximately one-fifth in cost of all compensation injuries. From compilations by the Council we learn that of all injuries one in ten becomes infected, but of all hand injuries one in four becomes infected. The average compensation expense of the hand injury is approximately $93.00; but, ***if it becomes infected, the cost doubles itself*** and approximates $188.00. In 1952, it has been estimated by the Council, that there was an over-all cost to industry, as a result of disabling hand and finger injuries, of 641 million dollars.

If we are to decrease the number of hand infections and lower the overall disability from hand injuries, then it is important that we understand Dr. Sterling Bunnell's repeated statement, "The outlook for the injured hand, as to whether it is doomed to disability or will regain useful function, depends primarily on the first-aid and early definitive treatment rather than upon the care during convalescence."

## First Aid

Recent surveys which have been reported by Dr. Don Kelly have shown how inadequate the safety program coverage is. He has stated that, in a survey made of plants employing less than 500 people, 70% of these were found to have only the most rudimentary safety coverage. It must be remembered that it is in this type of plant that 71% of our workers are employed. In 50% of these plants there was not even a doctor on call for injuries. The accident frequency rate in these small plants was two and one-half times that found in the larger industrial plants where there was an adequate safety and first-aid program. One can see that this type of "catch as catch can" treatment can be very disastrous.

## What is an Adequate First-Aid Program?

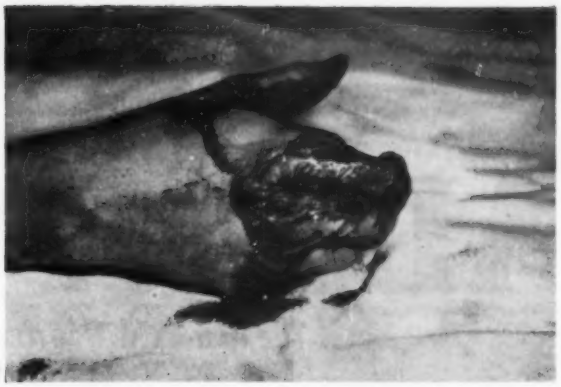
1. There must be a definite first-aid system in every plant, despite its size, with a doctor on call for the treatment of all injuries.

2. A nurse, or trained first-aid man, must be present in all plants to dress the trivial wounds, as well as to recommend the correct disposition for the more serious ones. In the small plants this first-aid man can be one of the employees who has been given some special training in the care of wounds by the company doctor, or by the doctor on call by this individual plant.

3. There must be a standardization of the type of care which the wound is to receive at the time of the initial injury, whether it be the trivial wound or whether it be the more serious wound.

It is important to remember that it is the trivial wound, which is neglected by the employee, that frequently becomes infected. The trivial hand injury which occurs in the plant, whether it is to be treated by the first-aid man, the nurse, or the plant doctor, warrants a thorough clean-up of the part, with removal of dirt and grease by the use of soap and water, and ether where indicated, followed by the application of an antiseptic locally and a sterile dressing.

As to the type of local antiseptic which one prefers to use in the wound itself, this may be one of the older mercurials, such as Mercurochrome or Metaphen, inasmuch as recent experimental work has found that these are not neutralized by small amounts of soap which may be left on the skin or within the wound at the time of



***Both the trivial and serious injury need adequate care***

# *Care of the Injured Hand*

clean-up. On the other hand, one may prefer to use one of the newer antiseptics which fall into a group known as the quaternary ammonium group, such as Zephiran or Phemerol. However, if these are to be used one must remember that while they are excellent germicides their effectiveness can be completely neutralized by minute amounts of soap which may be left on the skin or in the depths of the wound, and that they do not possess the bacteriostatic ability which has been found to be true of the older mercurials. In the event that one desires to use the quaternary ammonium compounds, then it is important that the preoperative preparation of the wound be with one of the new G-11 soaps, followed by the use of aqueous antiseptic locally. Otherwise, the soap which is used must be thoroughly cleansed from the wound in order to prevent it from neutralizing the antiseptic.

On the other hand, one must be constantly alert to analyze the type of wound with which one is dealing, for this determines the type of antiseptic which should be used locally. If a surgical clean-up of the wound is the object in mind then one of the quaternary ammonium compounds may be indicated. On the other hand if one wishes a longer lasting bacteriostasis, then one of the mercurials should be used. We must realize that in the presence of necrotic tissue it is of utmost importance to institute proper surgical debridement and in addition to utilize the systemic antibiotic therapy for the control of infection.

Today it is a common practice to apply a medicated adhesive bandage to the trivial wound. I feel that this is a good practice only if the one who dresses the wound initially utilizes the proper clean-up of the wound itself, together with the utilization of an antiseptic to the wound itself. Too often one sees wounds which have had such an application of a medicated adhesive bandage to a small laceration where the finger itself and the wound itself have had no clean-up. One can hardly expect a medicated adhesive bandage to penetrate adequately a dirty, acute wound.

These statements are not meant to condemn the medicated adhesive bandage for it is a useful dressing and represents a real advance in local wound therapy. A dressing which is not impregnated with some bacteriostatic agent, when placed upon the open wound quickly becomes filled with serum and blood, and it then provides an excellent test tube when held in contact with body temperature for the growth and multiplication of skin bacteria. On the other hand, the medicated adhesive bandage, by exerting a bacteriostatic effect, prevents the growth and multiplication of bacteria which might serve as the agents for the secondary wound infection.

It is important to point out that many studies in industrial dispensaries have shown the need for suturing of even some of the minor lacerations in the hand as a method of diminishing wound infection, as well as diminishing the period of partial disability as a result of such an injury. We are all cognizant of the fact that the wound that heals by primary intention gives less trouble than that which heals by secondary intention.

### The Serious Hand Injury

Industry and the insurance carrier are rapidly becoming conscious of the need for the best possible type of treatment for the serious hand injury, not only from the standpoint of cost in dollars and cents as exemplified by the 641 million dollar figure for 1952, but also in the loss of the skilled artisan who in many instances is found difficult to replace. We must organize under the plant doctor the finest type of program for the various phases of treatment needed in the care of the serious hand injury.

*(Continued on next page)*

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In 1949 the American Society for Surgery of the Hand prepared for the Committee on Trauma of the American College of Surgeons a series of bulletins on the care of hand injuries. A copy of this bulletin can be obtained by writing the Committee on Trauma, American College of Surgeons. Many industrial physicians have had large copies printed and posted in the emergency rooms of their plants in order that the acute hand injuries can receive the proper first-aid and acute surgical treatment. Any physician who is called upon to treat the acutely injured hand should review these bulletins in order that he may acquaint himself with the current surgical concepts and techniques with reference to the acutely injured hand.

Once first-aid has been rendered, which in the serious hand injury usually means no more than the application of a sterile dressing, the patient is then transported to the hospital and the definitive treatment is done under the best aseptic surgical conditions. This early treatment is merely the acute phase of plastic, orthopedic and peripheral nerve surgery, all of which are needed for hand surgery. The acute surgical treatment may need to be followed by one or two reconstructive surgical procedures in order to obtain a functioning hand. It is important for all those connected with the rehabilitation of the patient with the injured hand to be cognizant of the fact that reconstructive surgery does offer a great deal towards improving function in the badly injured hand. However, the surgery in itself must of course be followed by a further rehabilitation program which should consist not only of physical therapy but also should follow through with an on-the-job placement of the injured employee, first in light work, then gradually returning the employee to his former job as soon as he is functionally able.

Pictures by courtesy of Hynson, Westcott & Dunning, Inc.

## Lost-Time Illnesses

*(Continued from page 65)*

A typical family of four spends about $300 a year on medical bills, including insurance, bolstered by the health services and protection which the company provides each employee. Annual physical examinations, basic research in industrial medicine, special attention to such problems as alcoholism, and other activities have all worked toward improving health. Other company-paid plans cover hospital and surgical care for employees. The average U. S. worker loses 7.5 days of work a year because of illness or non-occupational accident. The average Du Pont employee loses only 4.3 days from the same causes.

A cardinal factor in the Du Pont employee's health record is the company's emphasis on preventive medicine. A corps of 166 doctors, six scientists, and about 350 nurses and technicians conducts this program. Annual physical examinations for all employees and periodic checks for certain employees in particular jobs are designed to prevent illness by keeping a close watch on general health and spotting trouble early.

By MARK M. LUCKENS
Consultant in Industrial Hygiene & Toxicology, N. Y. City

# TRICHLOROETHYLENE

Compound: Trichloroethylene

Synonyms: Ethylene trichloride, ethinyl trichloride, chlorylene, trieline, triclene, benzinol, tri, circosolv, perm-a-chlor, blacosolv, etc.

Formula: $CHCl:CCl_2$

Molecular Weight: 131.40

Appearance: Clear, colorless, mobile liquid

Odor: Faintly aromatic, sweet, odor reminiscent of chloroform

Specific Gravity: 1.45 (20°C)

Refractive Index: 1.4782 (20°C)

Vapor Pressure: 70 mm Hg (25°C)

Vapor Density: 4.54 (air = 1)

Evaporation Time: 3.8 (air = 1)

Melting Point: −73°C

Boiling Point: 87°C

Limit of Flammability: 10.30% to 64.50% (in oxygen)

Minimum Ignition Temperature: 463°C

Solubility in water: 0.1gm/100ml (20°C)

Solubility in Organic Solvents: Miscible with alcohol, ether, and oils. Forms azeotropic mixtures with methyl, ethyl, isobutyl, n-propyl, and isopropyl alcohols.

Stability: Stable in the presence of moisture at low temperatures; decomposes in the presence of large quantities of water or at a temperature of 125 C and above. Decomposes in the presence of light; decomposes when in contact with iron; gives rise to phosgene when in contact with open flame; dichloroacetylene is given off in the presence of alkalies.

Miscellaneous: At 25°C, a volume of 20.8ml, if volatilized and equally distributed, will produce a concentration of 200 ppm in 1000 cubic feet of air. 1 mg/ml is equivalent to 186 ppm. 1 ppm is equivalent to 5.37 mg/M³ @ 25°C and 760 mm Hg.

**Industrial Uses:** Replacement for carbon tetrachloride and used in formulation of special soaps, cleaning solutions, and proprietary solvent mixtures; thinner for coatings and varnishes; dry cleaning of clothes, solvent for sulfur and phosphorous in the purification of gases; degreasing of metals; extraction of fats and oils; cleaner for films, photographic plates, optical lenses; solvent for rubber; extraction of phenol from waterborne wastes; extraction of resin from wood; insecticide; disinfectant; etc.

**Medicinal Uses:** Has been used as an anesthetic. Maximum Allowable Concentration: 200 ppm (ACGIH)

**Toxic Action:** 1. Trichloroethylene is an acute narcotic. Exposure to concentrations of approximately 3% will result in death from respiratory failure. Its narcotic power is approximately twice that of carbon tetrachloride. It is a stronger narcotic than ether but weaker than chloroform. There is some evidence that it produces severe systemic damage, affecting the liver, kidneys, and the nervous system, particularly the optic nerve. As far as has been ascertained, this compound does not affect the blood forming organs.

2. The fatal anesthetic concentration is approximately two and one half times that of the narcotic dose, allowing for a large margin of safety.

3. Many authorities feel that some of the symptomology attributed to this compound is due, not to trichloroethylene per se, but to decomposition products.

**Symptoms of Exposure:**

A. Inhalation: 1. Acute:—headaches; lachrymation; burning and irritation of eyes, nose, and throat; nausea; vomiting; mental confusion; "drunkenness;" stupefaction; anesthesia; narcosis; ventricular tachycardia; circulatory failure.

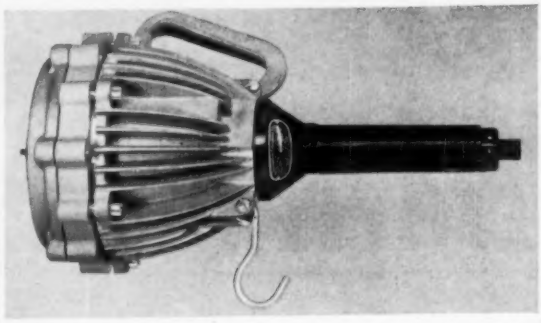
2. Chronic:—fatigue; irritability; difficulty in breathing; inability to concentrate; intolerance to alcohol; damage to liver, kidneys and respiratory tract; epileptic seizures; anorexia, neuritis, disturbances of vision; nausea; flatulence and vague digestive symptoms.

B. Oral Ingestion:—Gastrointestinal pain; nausea; vomiting; diarrhea; bloody stools; stoppage of kidney function; unconsciousness.

C. Skin:—Dermatitis—Redness, soreness, cracking, blistering.

D. Habituation to this compound is known to occur.

**Laboratory Diagnosis:** After absorption, trichloroethylene is, in part at least, excreted in the urine as trichloracetic acid. This excretion begins within two to four hours after exposure and reaches a maximum after some twenty to fifty hours. Since it is fairly constant, and the rate of accumulation is fairly slow, repeated small exposures result in comparatively high concentrations in the urine which can be measured accurately. Exposures resulting in a concentration of 20 mg per litre of urine appear to be tolerated without any significant effect on health. Workers whose urine show a level of 100 mg per litre always complain of definite ill effects. At a level of 200 mg per litre, these effects are marked and severe. The determination of urinary



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trichloracetic acid is a relatively simple, objective test for exposure to trichloroethylene.

**Detection and Analysis:** 1. Trichloroethylene gives a stable color when heated with a mixture of pyridine and sodium hydroxide. Details of this procedure may be found in the "Journal of Industrial Hygiene and Toxicology," Vol. 18, page 341 et seq (1936) in a paper by H. M. Burnett.
2. Combustion methods are available. A rapid method is described by A. Dargie in "The Analyst," Vol. 62, page 730 et seq (1937).

**Storage and Handling:** Trichloroethylene is a fairly strong narcotic and should be considered potentially deleterious to the health of those working with it. It is heavier than air and will burn or explode under proper conditions. Trichloroethylene should be stored in a cool, well-ventilated place, protected from light, away from open flames and high temperatures. On burning it yields highly toxic products.
Personnel handling this material should be provided with personal protective equipment, including gas type chemical safety goggles, plastic aprons, and gloves. Where splashing is unavoidable, a full face shield should be provided.
When entering tanks or enclosed spaces where this material has been stored or where it is suspected that vapors of this compound have accumulated, a rescue harness and a lifeline should be provided. An attendant should be present at all times to pull the worker to safety, if necessary. A hose mask with hose inlet in vapor-free atmosphere, an approved air line respirator, or a self-contained air supply should be provided and used.

**Precautions and Remedial Measures:** 1. Employees should be impressed with the potential hazards presented by this solvent. A standard operating procedure for the use, storage, and handling of this compound should be established and enforced.
2. Adequate exhaust ventilation should be provided where this material is used. It should not be used in enclosed or poorly ventilated spaces.
3. Personnel exposed to high concentrations of this material should be cautioned against the use of alcoholic beverages.
4. Personnel exposed to trichloroethylene should undergo routine, frequent urinalyses for the determination of trichloracetic acid.
5. This compound should not be used near open flames or at temperatures significantly above normal room temperatures.

### Correction

In the Industrial Hygiene Data Sheet for Perchlorethylene, on page 43 of the September issue, the chemical formula for the solvent was incorrect as shown. It should have been $Cl_2C{:}CCl_2$.

# THE COFFEE BREAK . . . BOOST or BUST?

How can companies get the most out of their "coffee break"? This question is of considerable importance to many managements right now. More will face it in the future, as the coffee break, already a custom of 35,000,000 Americans, continues to expand.

When well planned, the coffee break is an effective employee relations and production tool, sharpening worker efficiency, reducing fatigue, and boosting morale. Badly planned coffee breaks, however, can become cost and morale headaches.

Here are 4 check points to get the most out of your coffee break. They answer the following basic questions:

1. **WHEN?** Coffee Breaks are most effective in fighting fatigue just before it reaches its peak, normally about 10 a.m. and 3 p.m. Disabling injuries, according to safety surveys, occur most frequently between 10 and 11 o'clock in the morning and 3 and 4 o'clock in the afternoon.

2. **HOW LONG?** The length of coffee breaks depends on how far workers have to go for their coffee, and how fast they can be served. Locations close to work and a speedy dispensing system cut down the time; however, long trips to the refreshment area or dependence on outside sources can seriously delay production.

3. **WHAT TYPE?** Assembly line operations in which entire departments work as a unit, require set time coffee breaks. Staggered schedules are necessary unless the dispensing method can serve everyone at once. The disadvantage of staggered coffee breaks is that the first and last groups may have to take their breaks too soon after breakfast or too close to lunch. Another kind of coffee break, unlimited service, is practiced in many plants and offices where operations are planned individually. In this case, coffee is available from vending machines. This type of break has the advantages of permitting workers to take their break during natural work pauses and bring their coffee back to the places where they are working. Employees can also have their coffee without leaving the plant or office in order to get it.

## 1160 Coffee Breaks—And What They Did

**Of 1160 companies surveyed . . .**

82 percent note reduction in worker fatigue
75 percent note improved employee morale
62 percent note increased worker productivity
32 percent note reduced accident rate
21 percent note reduced employee turnover
16 percent note reduced scrap
15 percent note reduced waste
12 percent note reduced absenteeism

Pictures by courtesy of Bert Mills Corp.

4. **WHERE?** Coffee served close to work areas benefits both management and employee, because the break requires less time, and employees spend a greater part of their "rest" period resting.

Careful planning, on the basis of these check points, can help companies avoid the problems of abuse of time limits, long waiting lines, production interruptions, and excessive cost. When coffee breaks stretch beyond reasonable time limits, production costs become exorbitant. For example, a plant with 1 thousand employees who make an average of $1.80 per hour pays 300 dollars in wages every 10 minutes. In that case, if a coffee break

takes an extra 10 minutes a day, it costs the company at least 15 hundred dollars a week for this excess time, not to mention much higher production costs.

The introduction of mechanization in the form of coin-operated vending machines has solved many of the problems outlined above. Installed at no cost to the company, the unit serves hot coffee according to the user's taste, with or without cream or sugar, with both, or plain. A built-in change maker supplies change from dimes and quarters. The machine dispenses coffee 6 seconds after the drop of the coin, cutting down long waiting lines and eliminating the need of an attendant. Vending machines also attack the problem of keeping the coffee source close to the work place, since they can be installed in limited space without great difficulty.

Variations on the mechanized coffee vendor include free push button service in which the company pays only a small fee for the paper coffee cups.

## Laboratory Safety

A MANUAL FOR INDUSTRIAL AND university chemical laboratory staff members has been issued by the General Safety Committee of the Manufacturing Chemists' Association. The material contained in the "Guide for Safety in the Chemical Laboratory" is not intended as a fixed code but as a general survey of the accident and health problems in laboratories. The 234-page book is well illustrated and includes valuable reference tables on the hazardous properties of many chemicals.

Particularly noteworthy is the practical approach to accident prevention, through suggested safety rules and techniques. The manual outlines: good safety practices in handling hazardous chemicals; rules for the design and construction of a safe laboratory; equipment and service facilities that are needed; precautionary methods and personal protective equipment; fire, explosion and health hazards and how to overcome them; first aid and medical treatment for chemical injuries; and references to sources of safety information. The book includes a chapter on radiation safety and contamination control.

The guide is available from D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y., at $4.25 per copy.

## Air Analysis

REPRINTS OF TWO ARTICLES ON THE measurement of air pollution are available free from the Industrial Hygiene Foundation, Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Pa. One article deals with a low-cost sampler for measurement of low concentration of Hydrogen Sulfide, an air pollutant which sometimes causes the blackening of paints containing lead pigments. The second article entitled "Variables in Monthly Dust Fall Measurements" discusses the quality of air pollution caused by coarse particles subject to gravity deposition.


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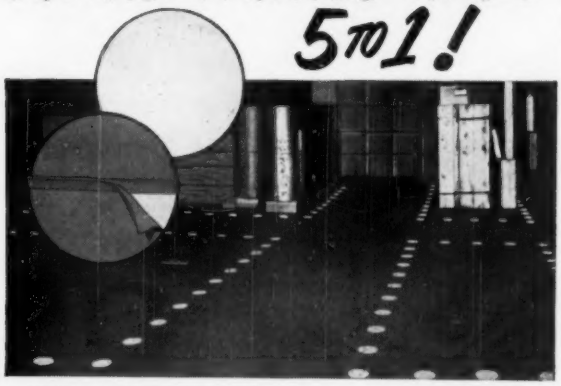

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# The Industrial Nurse

Editor
Rosamond J. Webster
R.N., A.M., Ph.D.

## Safety and the R.N.

MANY PLANTS IN WHICH an industrial nurse is employed do not, for various reasons, employ a qualified safety engineer. A nurse in a plant without safety personnel has specific opportunities in the safety field, although she cannot, and of course should not, be expected to be a replacement. Perhaps her chief function might rest in calling the attention of plant administrators to evident or possible health and safety hazards. In such instances, an insurance company engineer, a state labor or industrial hygiene division safety engineer, or a qualified engineer who is consulted on a fee basis can usually give the necessary technical advice.

For their guidance, industrial nurses should be generally informed on safety education procedures. A leader in the field of safety education suggests that safety meetings can serve the following functions: (1) give information, policies, procedures, plans; (2) decide on a course of action; (3) explain services, methods of functioning or conditions of cooperation; (4) provide a forum for the exchange of opinions on selected subjects, and provide a summary of agreed-on-action; (5) provide systematic instruction; (6) give inspiration to follow safety practices.

Since the well-trained industrial nurse fulfills in many ways the basic functions of a public health teacher, it is fairly simple in many instances to teach safety as a part of her daily routine. Whether group instruction is followed, or a person-to-person method with those who come to the medical department, the opportunities for safety education are ever-present. Readings on the subject are many. References to specific publications will be provided to readers who do not have such material readily available.

## Standards

A SPECIAL COMMITTEE of the American Medical Association has set up standards for the practice of industrial medicine which should be of interest to all industrial nurses. In the matter of facilities, the report on the subject reads as follows: "The quarters and facilities of the medical department should be adequate in location, arrangement, and equipment to provide freedom from noise, to insure comfort, cleanliness, and orderliness in the conduct of the medical work; and, especially, to yield complete privacy for interviews and medical examinations and for the maintenance of wholly confidential medical records.

"The type of medical practice conducted by the industrial medical department shall be of a high professional quality, and shall extend into all of the fields of medical activity that are appropriate to the needs of the industry concerned. The medical examination and the medical records should be such as to reveal the hygienic status of the population of the plant or industry, in a reasonably effective manner, with respect to injury, illness and disease of non-occupational, as well as occupational origin. They should also be adequate in respect to the medical problems of the individual employee. The information on the respective occupations, and on the hygienic problems and hazards associated with specific occupations and operations within the plant or industry, should be comprehensive and up to date, and the means by which such information is kept current, through reports, etc., should be part of the regular mechanisms of the medical operations and relationships within the industrial organization."

These proposed standards set the goals high and it may be difficult to achieve them in many comparatively small plants or even large ones. But the recommendations of the special committee of the A.M.A. certainly deserve study and careful consideration by all concerned with industrial medical service.

## Does It Pay?

A READER OF THESE COLUMNS has written to the editor requesting data as to whether it is financially desirable to retain an industrial nurse. Experience in the past 40 years has shown that an establishment with 500 or more employees will find it serviceable and economical to engage a graduate nurse, especially one trained as an industrial nurse. Her many functions include first aid and other emergencies, minor health needs, health education, ventilation, personal and social problems of employees, and many others.

Some years ago a national public health nursing organization defined the function of an industrial nurse as follows: "Public health nursing in industry consists essentially in the appreciation of nursing skills and procedures and instruction in the fundamental principles of healthy living adapted to the needs of the worker. The basic objectives of such a nursing service are to assist in the reduction of lost time from accidents and illness, and to promote the general physical well-being of the worker." This is of course a general and broad definition—application will necessarily vary from plant to plant.

Where the rate of minor injuries is comparatively high because of the nature of the work process; where

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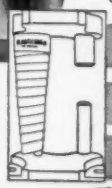

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medical facilities in a community are inadequate or not readily available; where the labor turnover is heavy and the number of preemployment examinations is comparatively large; where the hours of service of a part-time or "on call" physician are limited, the services of an industrial nurse can be of high value both to the employer and the workers. To decide whether it pays to retain an industrial nurse is fairly simple. Is the accident rate high? Is absenteeism frequent? Is labor turnover at a high rate? If so, it obviously does.

It may also be of interest to note the remarks by Dr. Curtis on the need for medical personnel in industry in his article on the care of hand injuries in this issue of "SAFETY MAINTENANCE."

## Action of Organized Medicine

IT IS ALWAYS HEARTENING to learn of an important professional group taking official action to spur the development of industrial health programs. Such action was recently taken by the Council of the Medical Society of the State of New York. It has been proposed that the society should establish an industrial health bureau under the direction of a properly qualified director, who would also combine the work of the existing workmen's compensation bureau.

The proposed objectives of this new bureau are the following: "(a) Collect information and statistics about industrial medical practice in New York State; (b) Obtain information about full-time and part-time industrial physicians; obtain a roster of leaders of industrial health for purposes of speakers bureau and teacher group; (c) Maintain a close relationship with various medical schools to foster teaching of industrial medicine; (d) Stimulate and maintain active interest in employers for establishing good industrial health services; (e) Stimulate interest in industrial health practice among the medical profession with particular interest among those general practitioners that could supply medical services to small plants and stimulate need for proper ethical practice and cooperation with family physician; (f) Establish a newsletter distributed to physicians, employer, and labor groups about industrial health matters; (g) Help to establish and improve standards for replacement and periodic physical examinations in industry with cooperation of employers and employees; (h) Interest each county society in establishing industrial health committees to stimulate local interest. We believe this a most important point because industrial health activities should begin at a local level, and pilot studies embarked on must be at a county level at first; (i) Maintain and cooperate with other agencies interested in industrial health services, such as local chambers of commerce, labor organizations, State Health Department, State Labor Department, medical organizations, such as Academy of General Practice and industrial nurses organizations; (j) Set up lectures at undergraduate and postgraduate levels by competent industrial health authorities."

These are specific indications of the wholesome growth of interest in the field of industrial medical service by probably the largest state medical society. Collateral growth of the interest in the same field by large organizations of nurses would be a stimulus to all nurses now serving or planning to serve in industry.

## What's the Answer?

MUCH HAS BEEN WRITTEN in professional journals, popular magazines, and the press on the presumed place that cigarette smoking has in the etiology of lung cancer. Some research workers seem to believe that the case has been fully proved; others are skeptical and point to inhalation of tars, dusts and fumes from industrial exposure and air pollution from automobiles, trucks, and other oil and gasoline consuming power and heating plants.

The leading official in cancer control of the New York State Department of Health wrote an article on the subject in the New York State Journal of Medicine (March 15, 1954). The following summarizes his comments: 1. The existing evidence points to multiple etiologic factors, including industrial dangers and cigarette smoking. 2. Known industrial dangers account for a relatively small proportion of lung cancer cases. 3. The evidence indicates that the risk of lung cancer among smokers is several times that among nonsmokers and may account for a major part of the incidence of lung cancer, particularly among males. 4. This evidence persists when comparison is made between lung cancer patients and patients with other conditions affecting the lung and bronchi and when the influence of residence and of occupation is equalized in lung cancer and control groups. 5. The available evidence is sufficient to justify public health action in casefinding and education to the effect that cigarette smoking must be presumed to play an important role in lung cancer. 6. Intensive further research in all aspects of the problem is urgently indicated. Further studies may be expected to provide more precise data on the excess risk to lung cancer among smokers. Additional evidence regarding etiology may result from experimental studies but may rest in the final analysis on the study of other possible etiologic factors found in smokers but not in nonsmokers. At present, no such differences are known. The weight of the evidence therefore indicates that the relationship between cigarette smoking and lung cancer is causal and not merely an "association." 7. In less than a decade the chance of developing lung cancer at some time during life has more than doubled among males in New York State. Two percent of all males may be expected to develop lung cancer at present rates of incidence. Since a majority of adult males are cigarette smokers and most of those over forty have smoked for many years, a good deal of the smoking effect probably has already been exerted. Hence, no appreciable decrease in rates may be expected in the next decade, even if everyone forthwith gave up smoking.

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# Learning..... the hard way

## EMERGENCY USE . . . BUT REGULAR INSPECTION

AN OVERHEAD electric traveling crane was stranded when one of its trolley wires broke. Being some distance from the permanent ladder to the floor, the driver had to use an emergency ladder on the side of the crane cab. The ladder consisted of a number of wooden rungs supported by fiber rope. While the driver was climbing down, the ropes broke and he fell 15 feet to the floor, suffering severe bruises.

Although to a casual inspection, the rope appeared sound, a closer examination showed it to be very dry and clearly unable to support a man's weight. Since the ladder was for emergency use only, it obviously was seldom used. However, this is no excuse for irregular inspection; in fact, the fewer times a piece of equipment is used normally, the more regular should inspection be. In this particular instance it may be advisable to use a tarred rope which is not so prone to dry out when used indoors.

This accident demonstrates the need for extremely careful maintenance of emergency equipment, since it is unlikely that such equipment will ever be called into use except when it must perform its function.

## WHAT'S WRONG WITH THIS STORY?

CLOTH WAS BEING processed in a trough of solution and passed through mangle rolls. It was possible to vary the gap between the rolls by a screw adjustment, and a round steel adjustable bar guard was fitted across the length of the rolls. There was a gap of less than half an inch between the top roll and the guard.

A workman, washing the top roll with flammable solvent from a bucket, had his fingers trapped between the guard bar and the moving top roll, when his attention was distracted by someone speaking to him. His injuries were so severe that he lost parts of the tops of three fingers.

On close examination one can spot several things wrong in this story. For one, a guard to be a guard has to be efficient in guarding what it's supposed to guard. This guard was not. Also, the danger of cleaning machinery in motion has been made very clear by a number of serious accidents such as this one. Not only these things are seriously wrong, but also the worker's use of flammable solvent in an open bucket. Oh yes, what was the other person doing talking to the man on the machine, unless he was warning him to get down from his dangerous perch?

## FIRE BY ACCUMULATION

A SPARK FROM an overhead crane ignited an accumulation of dirt and lint on the cables. An exhaust fan drew the flames into the fan section where another accumulation of dust had been allowed to gather over a period of time. No definite cleaning procedure had ever been established for the area. It took several hours to finally put out the blaze, which need never have started if the dust which caught the spark had been regularly cleaned up.

Management immediately ordered a regular inspection and clean-up program to prevent a recurrence. Poor housekeeping had caused another fire; but, at least, another plant had learned its safety lesson even if it was the hard way.

## LOW BRIDGE!

A STORE MANAGER was hurrying through his basement when he struck his head on a low beam. Result: a severe concussion and possible skull fracture. In nearly all parts of industry low beams are a hazard. Overhead, in poor or glaring lighting, the low beam waits in its blind spot to catch the unwary. For safety's sake, low beams should be painted with contrasting color stripes, preferably yellow and black. Short pieces of cord may be hung on either side of the beam. There they perform the function similar to that of "tell tales" placed in front of railroad tunnels. They are a warning to duck!

# "What's the Law?"

**Edited by**
**HENRY M. GROSMAN**
**Counsellor at Law, Newark, N. J.**

Master Superior Court, New Jersey
Member
American Bar Ass'n, New Jersey Bar Ass'n,
National Federation Insurance Council
Past Commander, American Legion, Post 10,
Newark, N. J.

• • •

### No Physical Trauma, But Compensable

THIRTEEN YEARS before, the claimant, an assistant steam engineer was working in a boiler room when a high pressure steampipe burst. The explosion was "violent and terrifying." As a result, the assistant steam engineer suffered a severe psychoneurosis.

The employer denied disability, and a small compromise settlement was approved by the board on March 11, 1941. The injured attempted to return to work, but has been unemployed since. In 1952, the claim was reopened and this time the board awarded the injured 65% of total and permanent disability. The employer appealed the award and it was held that even though the disabling psychoneurosis resulted from emotional shock alone and is not associated with any impairment of the physical function of the body, it constitutes an "injury."

*SIMON v. R. H. H. STEEL LAUNDRY, 25 N.J. Super. 50, 96 A. 2d 446, New Jersey, February 13, 1953.*

### Non-Listed Schedule Disability

An Oklahoma miner alleged that as a result of inhaling fumes from a chemical known as zanthate, on a particular day while in the course of his employment, he lost his sense of smell and partially lost his sense of taste.

The injured brought an action under the Workmen's Compensation Act of the State; but the commission found that he had not suffered an accidental personal injury within the meaning of the compensation act nor any loss of wage earning capacity, and dismissed his claim.

Upon appeal to a higher judicial body, the court concluded that injury caused by inhaling such gas may constitute an accidental injury. The loss of smell and taste constitute an actual disability under "other cases."

*FORD v. NELLIE B. MINING CO., 255 P. 2d 504 (Supreme Court of Oklahoma, March 17, 1953.)*

### Failure to Use Safety Device

While working on the construction of a tunnel for the city of Baltimore, the deceased employee was lowered into a shaft. During the descent, the hoist slipped because of the failure of a co-employee to set a safety pawl, and the employee was killed.

*STATE OF MARYLAND, Use of Reynolds vs. MAYOR and CITY COUNCIL, Maryland Court of Appeals. No. 93. February 8, 1952.*

### Impossible Injury—Not Compensable

A factory worker who did assembling work in an automobile plant claimed that a fellow employee, while going to the rest room, gave a plant hand truck a little push, causing it to pass over the instep of the claimant's right foot.

Later, while on crutches, the injured alleged that she slipped and injured a finger while grasping to regain her balance. Both the foot and the finger were swollen but not particularly bruised.

Four doctors found that the claimant was suffering from arthritis. The Commission found that when the hand truck was fully loaded, it weighed about 500 pounds. Had one of the iron wheels of the loaded



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truck rolled over her foot, she surely would have cried out and the bone would have shown some evidence of injury.

Had one of the auxiliary wheels rolled over her foot? It was found that this would be impossible without the body of the truck striking her severely. Based on this physical proof that it was impossible for the factory worker to suffer from an injury such as she described, no compensation was awarded.

*HARRIS v. CHECKER CAB MANUFACTURING CORP., Michigan Supreme Court, April 7, 1952.*

### Truck Driver Suffers Nervous Breakdown

On the night of the accident a truck driver had delivered a load of fuel oil to another town, returned to the terminal at about 2 A.M., checked in at the dispatcher's office, and gone home to bed.

The next morning, Sunday, the body of a woman was found lying in the middle of the street down which the trucker had passed at approximately the time it was believed that the woman had been killed. The police examined the truck which the driver had used and found particles of hair and flesh on the bottom of the truck.

On Sunday afternoon, the police took the driver to the station house and questioned him. After two or three hours of grilling, the driver made a written statement denying knowledge of any fatal accident and stating that he had run over a few rabbits on the highway during the night.

He agreed to take a lie detector test and again repeated his lack of knowledge of any accident. Following the test, an officer told him that he was lying and that he was "guilty as hell."

The driver returned to work on Wednesday and worked the remainder of the week. During this time he was nervous and excitable, subject to attacks of crying and sobbing, and smoked and drank coffee excessively.

On the following Sunday morning, a week after the accident, he suffered a stroke while reading a newspaper at home and was taken to a hospital for six weeks. His recovery was slow and when he returned to the job, he had to take employment as a warehouseman, at a reduced salary. Prior to the time of this incident, the driver was in good health, and was sober and industrious.

At the compensation hearing, conflicting medical testimony was presented as to the relation between the accident and the driver's present condition. The Court ruled however, that the driver had sustained a compensable injury. On an appeal by the employer, the higher court also affirmed the award.

*TOTH v. THE STANDARD OIL COMPANY, Ohio Court of Appeals, Eighth District, No. 22,309. April 14, 1952.*


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The plant's record for accident-free operation is exceeded only by that of the adjoining Marquette quarry at Brandon. Their record is 182 days better, operations having begun at the quarry that much in advance of the plant proper.

• • •

A NEW SAFETY record for the distilling industry was established in August when Schenley's Albert B. Blanton plant in Frankfort, Ky. completed a three-year period of operation without a lost-time accident. To date, Blanton distillery employees have worked an estimated total of more than 3,872,000 man-hours since August 8, 1951 without a serious injury, according to H. B. Spanagel, safety coordinator-production, of Schenley Industries, Inc.

These man-hours exceed former records set by other Schenley plants, and are over 1 million man-hours better than the record of any other distillery in the world, he said. Spanagel also reported that Schenley plants as a group completed an entire year without a lost-time accident, chalking up a total of approximately 1,750,000 man-hours in the process.

• • •

A TROPHY WAS presented to Clarence Bowlin, Safety Director of Anaconda Wire & Cable Co.'s Anderson, Ind. Mill and Chairman of that City's "Small Industries Group," commemorating the group's winning of First Place in Class IV in the national competition sponsored by the National Fire Protection Association of Boston. Anderson's Small Industries Group was commended for "its outstanding industrial community Fire Prevention program." Anaconda will place the trophy on display in its mill, then pass it on to the other companies which make up the Small Industries Group. The NFPA of Boston sponsors the annual contest to stimulate public fire safety consciousness and encourage general use of Fire Prevention Week as a "springboard" for year-round fire prevention.

• • •

THE DEPARTMENT of the Army Award for Merit for Safety Activities for 1953 was presented to Fort Monmouth, N. J., by Maj. Gen. George I. Back. The award was for the fine record in cutting down auto accidents plus safety performances on the job. During 1953 only two traffic fatalities occurred as compared to seven the year before.

• • •

THE ATOMIC ENERGY Commission has granted its Award of Honor for industrial safety to the Sandia Corporation. The award is granted by the AEC to those of its offices, contractors, and sub-contractors that work 3 million or more man-hours without a disabling injury, or that substantially reduce injury rates throughout one or more entire calendar years.

Sandia Corporation is the first AEC Santa Fe Operations contractor to achieve the Award of Honor. The Corporation's injury-free work period began on December 9, 1953 and lasted until March 26, 1954, when a packer tripped over an electric extension cord. During that period Sandia employees piled up a total of 3,057,441 man-hours without a disabling injury.

• • •

A NOTABLE SAFETY record of four years' operation without a lost time accident has been set by the Louisville Cooperage Company's Jefferson mill, an affiliate of Schenley Industries, Inc. The mill in mid-July completed 1,460 working days without a serious injury, R. E. Ray Jr., safety director of Schenley cooperage, reported. E. R. Deutsche, vice president of the division, announced that the company is planning an employee event in recognition of this safety record.

• • •

AN INTRA-COMPANY contest of its first aid teams marked the Philadelphia and Reading Coal and Iron Company's 50th anniversary of the founding of its safety program. The teams, representing operating units, competed for the title of Golden Anniversary First Aid Champions.

J. J. Forbes, Director of the U. S. Bureau of Mines, presented Certificates of Honor of the Joseph A. Holmes Safety Association to three P & R operations for outstanding safety achievements.

• • •

FOR WORKING without a single compensable accident during the year 1953, the Rust-Oleum Corp., Evanston, Ill. has received an award from its insurance carrier.

THE KNOX AVENUE plant in Chicago of the Admiral Corp., engaged in defense work and the production of the company's automatic three-speed phonographs, has been presented an honor roll certificate by its insurance carrier on completion of 321 consecutive days or 342,000 man hours of operation without loss of time from a disabling injury.

• • •

FIRST ARMY Commander, Lieutenant General Withers A. Burress, congratulated military personnel of his eight-state command for maintaining a perfect record of no deaths resulting from accidents during the long 4th of July weekend. This is the second time in the history of First Army that no fatalities occurred within a long holiday week-end. The first such score was established last Memorial Day.

FOR THE EIGHTH time since 1928, the Standard Portland Cement Division of Diamond Alkali Company at Painesville, Ohio, has won the National Safety Council's Certificate of Commendation for outstanding safety performance. Gordon C. Huth, Chairman of the Accident Prevention Committee of the Portland Cement Association, called the company's 1953 accident-free record—300,864 man-hours without a disabling injury—"a fine contribution to the great progress in making portland cement plants safe places in which to work."

• • •

THE ARMY'S TOP safety award has been presented to Fort Jay, Governors Island. Signed by Army's Chief of Staff, General Matthew Ridgway, the citation was given in recognition of Ft. Jay's superior safety record during the past year. This record showed a 70% accident decrease over 1951–52.

The only other First Army post to be so honored is New Rochelle's (N. Y.) Fort Slocum. The award was based on figures covering the number of military personnel involved in off-duty and on-duty accidents; civilian personnel in on-duty accidents; motor vehicle damage on post; and other types of property damage on post.

• • •

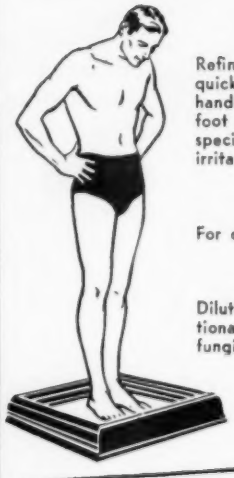
ELEVEN THOUSAND working days is a long time. It amounts to nearly 40 years. But for a large printing department to work 11,000 days, or about three and one-half million man-hours, without a single accident, is probably without parallel. That's the case at Republic Steel Corporation's Printing and Stationery Department located in the company's Truscon Steel Division plant in Youngstown, Ohio.

Actually, no one in the department has suffered an on-the-job accident since it was established in 1916. George A. Job, a city councilman in Warren, Ohio, is manager of this safety-conscious department where—as in every Republic operation—each employee attends a 15 minute safety meeting every two weeks.

• • •

EMPLOYEES OF THE Marquette Cement Manufacturing Company plant, Des Moines, Iowa, and quarry at Earlham, Ia., have achieved an outstanding safety record. The plant will receive its 5th award of the Portland Cement Association safety trophy, symbolizing accident-free operation throughout 1953. As of December 31, 1953, there had been no lost-time accident at the plant in 6 years. The same safety program carried the men in the Marquette quarry at Earlham through 2¼ years of operation without an injury.


COMPLETE PROTECTION AGAINST
ATHLETE'S FOOT
at moderate cost!



IMPROVED ALTA-CO POWDER

Refinements and improvements now make ALTA-CO more quickly soluble, more agreeable generally and better to handle. Dissolved economically in water for the all-important foot bath, ALTA-CO kills *in less than a minute* all different species of fungi commonly found in Athlete's Foot. Non-irritating; harmless to towels.

ALTA-CO FOOT POWDER

For dusting feet after shower or other exposure to moisture.

H.D. FUNGICIDE FLOOR WASH

Diluted 1 to 300 in water, this powerful wash provides additional protection against Athlete's Foot on surfaces where fungi are commonly found.

Ask your DOLGE SERVICE MAN about money-saving offer on the DOLGE FOOT TUB.

FOR
FREE SANITARY SURVEY
OF YOUR PREMISES
SEE YOUR DOLGE SERVICE MAN

dependable
DOLGE
WESTPORT, CONNECTICUT

(For details, use Key # X-50 on card on page 99)

AN AWARD OF HONOR was presented to Brigadier General Robert G. Lovett, Army East Ocean Division Engineer "for distinguished service to safety" in the construction of military installations in Canada, Greenland and Iceland. The National Safety Council plaque commends the Division for an average reduction of 64 percent in the accident, injury and fatality rates. At the same time, a special award signed by General Matthew B. Ridgway, U. S. Army Chief of Staff, will go to the Division's Northeast District, which built the Thule Air Force base, and Colonel Morton Solomon, District Engineer.

The East Ocean Division is nearing completion of a $700,000,000 program of military installations, including many Air Force bases, in the arctic and in the Atlantic. The safety record was considered particularly outstanding because of the extremely hazardous working conditions in many northern areas.

• • •

CATERPILLAR TRACTOR CO. announces that the first six months of 1954 were the safest in the company's history.

H. S. Simpson, safety manager, said that accident frequency was reduced 15 percent as compared with the same period last year. The severity of injuries, he said, declined 50 percent. Simpson pointed out that the company's improved safety performance was made in spite of the fact that 1953 was the safest full year in its history.

• • •

HAVING PASSED OVER 5,940,000 man-hours without a major injury, the employees of the General Electric operated Hanford atomic energy project will receive a free prize from the Central Safety Council. This marks the third time in the history of GE operation at the plant that HAPO personnel have become eligible for the special award, which includes a variety of prizes.

Removes dirty suds and water from scrubbed floors...dries flooded areas.

Sweeps floors "with air." No cloud of dust...no sweeping compound needed.

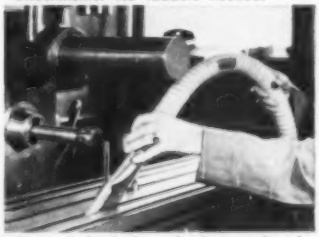
Drains coolant sump tanks.

HILD

WET-and-DRY VACUUM does scores of clean-up jobs

Cleans overhead pipes...no ladders needed, no shower of dust.

Cleans shelves and ledges with hi-up attachments. No ladders needed.


Cleans lathe beds and other crevices in machinery.

HILD Heavy-Duty Vacuum

Always ready for any clean-up job...wet or dry...without adjustment or change of filter. Big capacity...55 gallon tank holds 40 gallons recovered liquid. Easy to move, easy to empty through quick-opening 2-inch gate valve.

See HILD Equipment Demonstration
BOOTH 130
National Safety Congress, Chicago, Oct. 18–22

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HILD System
MAINTENANCE EQUIPMENT & SUPPLIES

(For details, use Key # X-51 on card on page 99)


TWO AMERICAN Cyanamid Company plants have earned Company awards for outstanding safety records, it was announced recently by Stanley F. Spence, the firm's Safety and Loss-Prevention Director.

The President's Safety Award, highest safety honor in the Company, was received by the Piney River, Virginia, plant for its record of 3,000,000 manhours without a disabling injury. This covers the period from December 20, 1950 to June 26, 1954. Piney River is the 5th plant to receive the award.

The Award of Merit was earned by the Company's Niagara Falls, Ontario, plant for a perfect record extending from October 16, 1953 to July 14, 1954. The plant worked a total of 1,470,000 manhours without injury during this period.

THE MILLER BREWING CO., Milwaukee, Wis., has achieved an accident frequency record of 2.84 per million man-hours for the first six months of 1954, the lowest ever recorded for the period in the history of the company. The company utilizes illuminated bulletin boards showing current safety records in its attempt to win the 1954 safety contest sponsored by the U. S. Brewers Foundation.

• • •

THE PHILADELPHIA Quartermaster Depot was presented with the annual Department of the Army Award of Merit for Safety for outstanding achievement among installations of the Second Army Area in maintaining safety of operations.

The award was made by Brigadier General H. R. McKenzie, Quartermaster Corps Comptroller, on behalf of the Commanding General, Headquarters, Second Army, Fort George G. Meade, Maryland. It was accepted by Major General R. P. Hollis, USA, Depot Commander.

General McKenzie lauded the Depot's achievements in accident reduction and the individual participation of personnel in eliminating unsafe practices and safety hazards. Present at the ceremony were Mr. W. T. Buhrman, Safety Director, Headquarters, Second Army, and Mr. Walter E. Stepp, Safety Director, Philadelphia Quartermaster Depot.

• • •

A UNIQUE INDUSTRIAL safety record—a quarter of a century without a single time-losing injury—was achieved recently by employees of Du Pont's Rubber Laboratory, Deepwater Point, N. J. This is the longest injury-free time span recorded to date by any unit of the Du Pont Company, current holder of two world safety records in plant operations and construction.

Since July 1, 1929, the day the Rubber Laboratory first opened, it has operated more than 3,200,000 man-hours without a time-losing injury—this, despite such potential laboratory hazards as high-pressure steam equipment, acids, flammable liquids, fumes, and wringer-type machinery. This outstanding record was recognized by the presentation of the Board of Directors Safety Award and a "Citation for Distinguished Service to Safety from the National Safety Council.

• • •

FOR REDUCING THE frequency of disabling injuries, Fonda Container Company of St. Albans, Vermont, an affiliate of Standard Packaging Corporation, has again been awarded the National Safety Council's "Green Cross for Safety" in the 1953 Paper Industry Safety Contest.

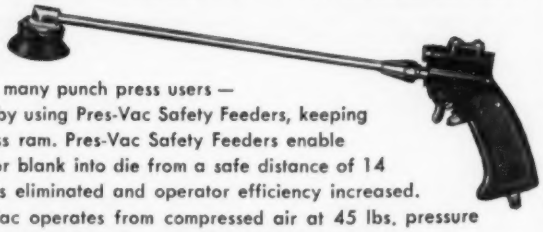
• • •

TWO SAFETY AWARDS were received by Marietta (Ohio) Pipe Shop employees of Dravo Corporation from the Ohio Industrial Commission. One award was from the State of Ohio for no disabling accidents during 1953, and the second certificate was for winning first place in the Metal Fabricating Section of the Greater Marietta Safety Council.

Employees of the Wilmington Shipyard of Dravo Corporation also recently received two safety awards. They were first in the National Safety Council's Marine Safety Contest for 1953 among private light shipbuilding and repair yards. They also won a special Dravo citation for no lost-time accidents during 1952 and 1953.


Western Stove Works

Saves Fingers with Pres-Vac SAFETY FEEDERS



Western Stove Works, well-known California manufacturer — like so many punch press users — saves workers' fingers by using Pres-Vac Safety Feeders, keeping fingers away from press ram. Pres-Vac Safety Feeders enable operator to feed part or blank into die from a safe distance of 14 inches. Fear of injury is eliminated and operator efficiency increased.

Also AIR BLAST VALVES

Pres-Vac operates from compressed air at 45 lbs. pressure which passes through a venturi to create a vacuum.

F. J. LITTELL MACHINE CO. Speed with Safety

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CHICAGO 13, ILLINOIS
District Offices: DETROIT and CLEVELAND

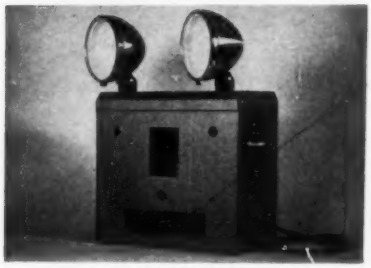
Write for FREE Catalog

(For details, use Key # X-52 on card on page 99)

# KEEPING UP WITH

# . . . . Recent Developments in Emergency Lighting

**Despite the rapid growth of emergency lighting equipment in the commercial, retail and industrial fields, the National Fire Code has only recently taken cognizance of this type of lighting. The Code now has a special section for automatic stand-by lights. The following products represent some of the latest developments in the general field of emergency lighting.**



## EMERGENCY LIGHT FEATURES EASY INSPECTION

DESIGNED TO PROVIDE an auxiliary 6-volt light source which will come on instantaneously and automatically when the normal a-c supply fails, the Nickel Cadmium Battery Corporation announces its new Ni-cad Emergency Lighting Unit. Heart of the unit is this manufacturer's Nicad steel encased, alkaline storage battery.

Mounted on top of the unit are two 6-volt lamp heads and reflectors. Front panel mounting includes a high-rate charge timer that can be set from 0 to 12 hours, an amber neon "readiness" light, a red neon "high rate" light, a 6-volt light switch and a push button test switch. A removable sub-assembly carries the transformer, rectifier, cut-over relay, timer, trickle-charge resistor and all other components. The circuit is designed to maintain the battery on trickle-charge and to permit recharging the battery within 12 hours. The duration of the high rate charge is set by the timer. The red neon pilot light, indicating that the high rate is on, goes out when the charge is completed. The amber neon pilot light indicates that the a-c is on and the unit is in standby condition, ready to operate. If the 6-volt light switch is open, the amber light will be out, thereby indicating the unit is not in "readiness" condition. The push button test switch makes it possible to check operation of relay, battery and lights.

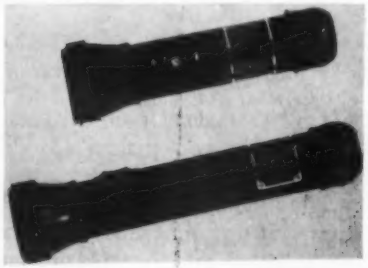
*For details, use Key # EL-1 on Inquiry Card on page 99.*

## NEW FLASHLIGHT BULB

FLASHLIGHT BULBS which, at the flip of a switch, throw either a flood or spot of light, have been developed by General Electric's Lamp Division. Like automobile headlamps, the new flashlight bulbs contain two filaments, each of which may be turned on independently. One filament, in the form of a single loop of tungsten wire, produces a broad flood of light for nearby seeing. The other filament, a concentrated coil, throws a narrow beam of light for seeing objects at a greater distance.

The flashlight user need not make adjustments in order to produce the desired spot and flood beams, a "prefocus" base insuring accurate positioning of the filaments within the flashlight reflector. Operators of flashlights which will use the bulbs will find three positions for the push button—an "off" position, one for the spot, and the last for the flood of light. Designated PR-14, the new bulbs are seven-sixteenths of an inch in diameter and have a maximum overall length of one and three-sixteenths inches. They are rated at 2.4 volts and one-half ampere.

*For details, use Key # EL-2 on Inquiry Card on page 99.*



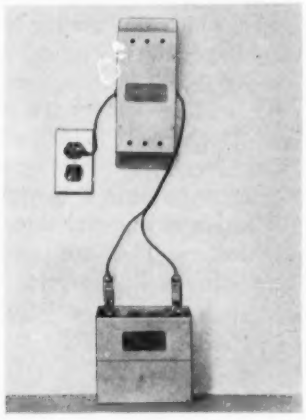
## INDUSTRIAL FLASHLIGHTS

TWO NEW INDUSTRIAL flashlights designed for maximum safety have been developed by Olin Industries, Inc. The flashlights, which have been approved by both Under-

writers Laboratories and the U. S. Bureau of Mines, have identical safety features except that one is a 3-cell (#3745) and the other a 2-cell model (#2745).

Both flashlights are of solid drawn brass construction with barrels completely insulated with heavy corrugated fibre. End caps and lens rings are thickly cushioned against breakage with neoprene-type rubber. A circuit breaker which instantly cuts contact with the batteries if the bulb is broken prevents sparking. End caps on both flashlights are removable for easy loading and each cap has a spare bulb holder. The octagonal head is designed to inhibit rolling. Each flashlight is constructed so that it can easily be sealed to prevent unauthorized personnel from disassembling them.

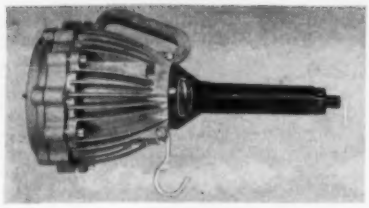
*For details, use Key # EL-3 on Inquiry Card on page 99.*



## CHARGER FOR NICKEL CADMIUM BATTERIES

NOW AVAILABLE from the Dual-Lite Co. is a charger (Model BC-1) designed for single battery charging of nickel cadmium batteries. Proper connections are made to the battery and the AC cord can be plugged into any standard 115 volt, 60 cycle AC outlet. The charge rate is maintained for eight hours to recharge handlight batteries.

*For details, use Key # EL-4 on Inquiry Card on page 99.*



## PORTABLE EXPLOSION PROOF FLOODLIGHT

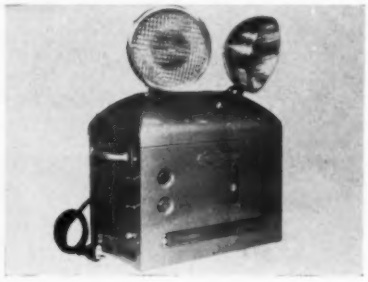
DEVELOPED FOR OIL companies who operate tankers, oil refineries, chemical plants, the airplane industry, etc., this new light designated Model XP-160, by the Stewart R. Browne Mfg. Co., Inc., is suitable for tank cleaning and similar hazardous operations. It is approved by Underwriters' Laboratories for Class I, Group D Hazardous Locations, and meets U. S. C. G. electrical equipment requirements for portable lights for use on merchant vessels inspected by the Coast Guard.

### Construction Features

The globe holder and handle are of one-piece construction, made of a thermo-setting rag-filled material of high impact with a heavy wall, stainless steel insert for added strength in supporting the aluminum castings on the front end of the unit. High impact aluminum, anodized to resist corrosion, is used for the superstructure of the light, designed to withstand shock and with fins running vertically on the outer contour to keep the housing cool at all times. The glass lens is made of high-impact heat-resistant glass to withstand both thermal and mechanical shock. There is a spun aluminum gasket backed up by a compressed asbestos gasket between the glass and the spun gasket. The socket assembly is constructed with saddles to give the unit a shock mount, and the material is resistant to high temperature.

When re-lamping, it is never necessary to dismantle the lens assembly, which is held on to the housing by bronze cadmium plated Allen set-screws. These are the only screws which need be removed. In addition, the 150 watt Par-38 sealed beam lamp with pyrex lens is supported inside the aluminum housing by two spinnings which give added vibration resistance. When re-lamping, it is only necessary to remove the upper spinning.

*For details, use Key # EL-5 on Inquiry Card on page 99.*



## EMERGENCY LIGHT WITH GLASS JAR BATTERY

THIS NEW low-cost automatic stand-by light conforms to the National Fire Code and is fully UL approved. The glass jar (non-automotive type) battery is capable of delivering 91% of rated capacity after thirty minutes of actual use. Its extra-heavy, pure lead plates, patented leak-proof terminals and low specific gravity assure an unusually long shelf life with a minimum of maintenance, claims Carpenter Mfg. Co.

New features include external switches for quick testing. Other switches control the battery charger and disconnect the lampheads should unit be taken out of service. A red pilot light indicates when battery is on high charge and an amber light indicates readiness for service. Visible disc float hydrometer eliminates necessity for ladder-climbing. Special components withstand constantly energized condition and assure instant light when fuses blow or power fails.

*For details, use Key # EL-6 on Inquiry Card on page 99.*

### EMERGENCY GENERATORS

A NEW GROUP of 1800 rpm emergency power generators designed to combat the crippling effects of a power failure is announced by Katolight Corp. The generators range in sizes of from 2000 watts to 15,000 watts, easily belted to the ordinary farm type tractor or any other speed governed engine power. They develop the same 115/2300 voltage as supplied by the highlines and come in two designs: revolving armature and revolving field. The latter, having a separate direct connected exciter, is particularly noted for its overload and motor starting ability. A standard pulley and panel complete with a voltmeter and rheostat can also be supplied along with necessary approved transfer switches. The generators are also available in 3 phase characteristics.

*For details, use Key # EL-7 on Inquiry Card on page 99.*

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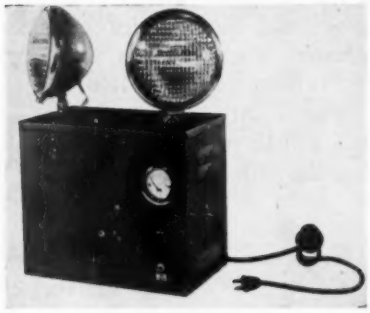

### 15–20 YEAR EMERGENCY LIGHT

ANNOUNCEMENT IS made of a new emergency light, Model CH-25, with a nickel cadmium battery, which is rated with a life expectancy of from 15 to 20 years. It contains two six-inch heads with adjustable sealed beam lamps, which will give approximately three hours of lighting. The unit is suitable for buildings where a sudden power failure could have serious results, such as hospitals, movie houses, public buildings, office buildings, apartment dwellings and garages, to provide automatic and instant emergency illumination for the areas protected.

Operation of the unit is completely automatic. It has automatic trickle charging with provisions for switching to a high rate charge, a test switch and voltmeter for testing battery, and is for use on A.C., 115 volts, 60 cycles. Other models are also available. The battery is nickel cadmium, 5 cells, 6 volts, 30 ampere capacity, which has approved long life and withstands many abuses that render most batteries useless. The whole unit comes in a 20 gauge steel case with a grey wrinkle finish. Size is 14" x 6" x 10" high. Manufactured by Dual-Lite Co.

*For details, use Key # EL-8 on Inquiry Card on page 99.*

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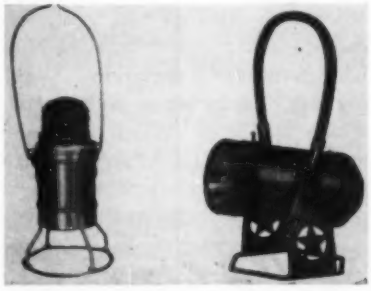

### ELECTRIC LANTERNS

BUILT TO RIGID specifications by the Star Headlight & Lantern Co., Inc., these two North Star models have been found suitable for railroads, in the industrial field for use by maintenance men, watchmen, etc., in the construction and mining field, and also by police and fire departments and trucking concerns. Both models are of moisture-proof, dust-proof and shockproof construction and use standard, long-life 6 volt batteries.

Model 215F Flashing Safety Lantern is designed especially for emergency use wherever danger signals are indicated. Equipped with two separately lighted bulbs and red Fresnel globe for complete visibility in all directions, it flashes on and off 50 times per minute, projecting a strong light in persistent eye-catching flashes. Available without flasher unit or with green, yellow, blue or clear Fresnel globes. The 6 volt battery is said to give uninterruped service for 60 to 70 hours.

Model 179N is a spotlight type and has a specially designed reflector which projects a smooth, bright light without dark spots or rings. One-piece body and stand are constructed of durable, light-weight aluminum alloy. The body swivels to desired position, and the non-tip base holds the lantern steady even on rough, uneven ground. Equipped with weather-proof toggle switch conveniently located to permit operation with carrying hand.

*For details, use Key # EL-9 on Inquiry Card on page 99.*

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## *Electrical Headaches*

THE SYMPTOMS and remedies for electrical failures in office and industry are descriptively illustrated in a 16-page brochure, "Electrical Operation Headaches—How to Cure Them and Profit," presented by B. Eichwald & Co., Inc., electrical engineers and contractors, 237 East 39th Street, New York.

Specifying a prescription of survey, service, and maintenance as the cure for electrical headaches, this brochure is directed at saving management time and money. Among the problems considered in this booklet are: Wiring, Lighting, Telecommunications, Safety Equipment, and Electronics.

Comparing an electrical system to the human body, the booklet takes a "preventive medicine" approach in discussing electrical ills, by suggesting methods of avoiding electrical failures before they occur. It points out that common electrical troubles like short circuits, overloading, and mechanical injury, can often be avoided through proper planning for the future as well as the present, and by consulting experienced technical personnel.

Copies of the booklet can be obtained from the company's office at 237 E. 39th St., New York City.

**2nd Look at Welding**
*(Continued from page 24)*

them against violent rupture in cases of fire or other exposures to unwarranted high temperatures, the user of compressed gases should not trust to luck too long lest a serious accident occur. One can imagine the calamity that would have resulted if this cylinder had ruptured when connected to an oxygen tent providing some patient the life saving features of oxygen therapy.

Dusts may be defined as solid particles of matter which are ordinarily produced by grinding, crushing, drilling or blasting, plus the chipping or brushing of welds. These materials may be carried about the welding shop and into other work areas unless point-of-operation or first class general ventilation is provided. The size of the particles varies from what is called ultra-microscopic to those which are visible. From a hygiene standpoint, the significant particle size of dust ranges from a fraction of a micron to 10 microns. (A micron is 1/25,000 of an inch). The most frequently encountered dusts in industrial shops are of inorganic minerals.

Fumes may be defined as solid particles which are formed by processes similar to combustion, condensation and sublimation. The most common types of fumes encountered in industry are usually caused by the oxidation of metal, such as the oxides of lead or zinc. Particle size is usually smaller than that of dust and ranges below one micron. In contrast to dusts, fume particles tend to join together very easily. Many people erroneously speak of fumes when they mean vapors of liquid materials, such as acid solutions, organic solvents, and the like. Fumes are usually found where molten metals such as lead, zinc, and cadmium are being processed or used in industrial operations. Welding may produce fumes of the metals which are being welded or fumes and gases from the variegated coatings of weld rods.

It should be remembered that metals may produce both dusts and fumes, according to the nature of the operation and the state of the materials when processed. For example, among the heavy metals, such as lead, dust may be of equal or greater importance than fumes as a causative factor in disease. Other mineral dusts and metallic dusts that are also considered of etiological importance are: (a) toxic and/or irritant dusts (from heavy metals and their salts, such as arsenic, lead, manganese), and (b) fibrosis-producing dusts, such as free silica and asbestos.

Exposure to a potentially harmful material is not necessarily a health hazard. It depends on the state of the material. Whether it is an actual health hazard can only be determined by an industrial hygiene engineering survey, in which the amount and kind of exposure is rated, according to accepted standards of concentration, size, and quality of dusts and fumes. Many persons erroneously state that there is a "lead hazard," for example, when it is only known that contact is being made with lead.

The importance of air contamination will be evident when it is realized the pathologic effects produced by dusts and fumes are brought about almost entirely by inhalation. There is one outstanding exception, the absorption through the skin of lead in the form of tetraethyl lead, which is of course a fluid. No dusts, so far as is known, produce any systemic pathological conditions from skin absorption, and it is doubtful that any kind of true fume is absorbed by the skin.

From the etiologic point of view, particularly with reference to pathologic effects, the following outline shows how different types of substances among the dusts and fumes act on the various systems in the body to produce pathological effects. The lists are not complete; just typical examples are shown.

(a) General system poisoning: Arsenic, lead, mercury, vanadium.
(b) Substances acting on the gastrointestinal system: Antimony,

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They Insulate

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One costly FOOT ACCIDENT could have paid for

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Reece has a shoe or sandal to fit your needs.

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Dept. SM-10 Columbus, Nebraska

(For details, use Key # X-53 on card on page 99)

cadmium, lead, mercury, zinc.

(c) Substances acting on the skeleton and joints: Lead, mercury, mesothorium, phosphorus, radium.

(d) Substances acting on organs of special sense: Arsenic, lead, manganese, mercury.

(e) Substances acting as fatal poisons: Lead, mercury.

(f) Substances acting on the genito-urinary system: Arsenic, lead, mercury, vanadium.

(g) Substances acting on the brain and nervous systems: Arsenic, lead, manganese.

The name, "Metal Fume Fever," is applied to the condition which results from breathing fairly heavy concentrations of freshly formed metallic oxide fumes, principally zinc and one of its alloys, brass, although the condition may result from the inhalation of other metallic oxide fumes. Metal fume fever is not a systemic poisoning, but it should be borne in mind that some of the metallic fumes that cause it, such as lead, cadmium, mercury, and manganese, may also cause systemic poisoning.

The symptoms come on some hours after exposure, usually after leaving work. The first sign is a dryness of the throat, which may be followed by a dry cough and a feeling of heaviness in the chest. Rise of temperature, accompanied by sweating, and leucocytosis and elevation of the pulse rate and the blood pressure follow, usually with chills. The symptoms ordinarily pass in 12 or 24 hours and the usual experience is that the employee returns to work the following day. A natural immunity is conferred on certain types of workers, but the immunity seems to be lost rapidly after removal from continuous exposure.

For ordinary conditions in which only limited dusts are encountered along with a fume condition, simple filter type respirators will protect the welder against the hazard of breathing these dusts and fumes. The filter is made of chemically treated filter paper or felt through which the air is inhaled.

The particular type of filter employed will depend upon the kind of contaminant present in the air. Since it takes less of the more toxic materials such as lead to affect the wearer than the harmful amounts of fibrosis producing dusts, a more efficient filter will have to be used against toxic dusts than against fibrosis producing and nuisance dusts.

The United States Bureau of Mines tests respiratory protective devices against various air contaminants under carefully controlled conditions. Devices meeting its tests receive that Bureau's official approval, and this is indicated by approval numbers on the device and a reproduction of the certificate on the package. Equipment approved by the U. S. Bureau of Mines for the particular contaminant or class of contaminants in the air should be used.

Pictures by courtesy of: Top—Kaiser Services; Bottom—U. S. Atomic Energy Commission.

Noise levels are no obstacle to this safety signal! Nail mills, boiler factories, shuttle rooms no longer present a signalling problem.

Forget NOISE!

275 BEACON RAY

The warning beam of light from this Beacon Ray will penetrate through any noise levels! Rotating through 360° this concentrated beam will reflect off any bright surface to warn the unwary even though they may be facing the other way.

With or without audible signals in service a Beacon Ray with The warning beam of light from this Beacon Ray will penetrate An audible signal will fail to do this. Write for full details on the new low-cost Federal 275 Beacon Ray warning light.

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Another SCIENTIFIC INDUSTRIAL Safety Suggestion!

FLEXIBLE STEEL INSOLE SAFETY BOOT

Note the special safety features of this boot . . . designed for rugged use under wet working conditions. Sizes 6 to 13. Available in Plain Toe Knee Boot and Steel Toe Safety Boot.

ONLY ONE ITEM IN THIS COMPLETE LINE

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See Us at the National Safety Congress BOOTH 303

(For details, use Key # X-55 on card on page 99)

# TRANSPORTATION SAFETY

## Driver Education Awards

AWARDS HONORING THE quality of their driver education were made to ten states when the board of judges of the Seventh Annual National High School Driver Education Award Program announced the results for the 1953–54 school year. Judged outstanding among the 48 states and the District of Columbia were Massachusetts, which received the only Award of Excellence; Arizona, California, Connecticut, Delaware, Oklahoma and New York, each of which was given an Award of Honor; and Michigan, Minnesota, Nevada, New Jersey, Ohio, Pennsylvania, Vermont, Virginia and Wisconsin, all recipients of Awards of Merit.

Thomas N. Boate, Accident Prevention Department manager of the Association of Casualty and Surety Companies, which sponsors the program, said the awards were made on the basis of such factors as percentage of students enrolled in driver courses, number of hours of classroom work, number of hours of practice driving, educational background of teachers, etc.

**USE ABSORBENTS ON ICY LOADING PLATFORMS**

THE COMING WINTER months present special hazards to personnel and mobile plant equipment when loading platforms, ramps and plant yards may become slippery from ice. A simple way to maintain safety underfoot for both workers and plant lift trucks is the use of certain types of "oil and grease absorbents."

The product is also widely used in interior and exterior areas for reducing the slippery hazard of spilled oil and grease, for controlling coolants and cutting oils around "wet" machines and for cleaning floors. The absorbent is said to offer high resistance to breakdown when wet, and its use reduces the fire hazard of spilled flammable liquids.

*For details, use key # TS-7 on Inquiry Card on page 99.*

## Vehicle Safety Check

"FOR THE FIRST TIME in the history of the annual vehicle Safety-Check more than 1 million vehicles were voluntarily checked for safe operation," said W. F. Hufstader, Chairman of the Inter-Industry Highway Safety Committee, in announcing results of the annual "Check Your Car (Truck)—Check Accidents" program.

"The 1954 report revealed ONE out of every FOUR vehicles checked was in need of maintenance attention to one or more parts affecting safe operation," Mr. Hufstader stated. "Brakes and rear lights were the two items most frequently found in unsafe condition. These items were found in need of attention in 1 out of every 10 vehicles."

"The condition of brakes was found to be slightly improved over the 1953 report when 1 out of 6 failed to pass the voluntary check," he added. "However, rear lights appeared more frequently in need of attention as the figure changed from 1 out of 13 in 1953 to 1 out of 10 this year."

The "Safety-Check" program was conducted during the month of May by the Inter-Industry Highway Safety Committee, in cooperation with the National Safety Council. Through the combined support of police, public officials, safety, civic and business groups, together with dealers of the automotive and allied industries, these community-wide programs accounted for the checking of 637,123 vehicles.

"The 1954 program has shown that results can be obtained when the efforts of business, public officials and civic groups are combined to carry out needed traffic safety programs," Mr. Hufstader said. "Mo-

bilization of public support was urged during the White House Conference on Highway Safety, and it is encouraging to note that results can be obtained when communities coordinate activities to help solve the nation's traffic accident problem."

"Results of the check point up the need for every driver to make certain his vehicle is in safe operating condition at all times," he added. "Individual responsibility must be assumed if we are to continue our current gains in the reduction of traffic accidents on our streets and highways."

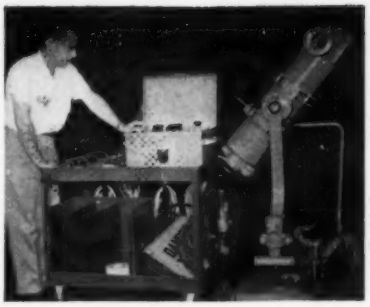
The condition of individual items revealed in the check brought added emphasis to the program slogan "Can You See, Steer, Stop Safely?" Heading the list of ten items checked and needing maintenance attention for safe vehicle operation were: brakes—1 out of 10; rear lights—1 out of 10; front lights—1 out of 15; steering—1 out of 24, and exhaust system—1 out of 24.

## Only Human?

THE "REAL VILLAIN" in most traffic accidents is human carelessness, according to the American Petroleum Industries Committee in an analysis of 1953 accident figures carried in its bi-monthly publication, the Tax Economics Bulletin. State reports dealing with highway fatalities "reveal that more than 9 out of every 10 highway deaths nowadays are caused by driver errors or by a combination of driver and pedestrian errors," the Bulletin declares. "In these cases, there were no reported defects in the road, vehicle or other factors beyond human control."

The article points out that in 1953 there were 27,200 fatalities in rural areas in contrast to 11,100 deaths in urban areas. As to the reason for this disparity, "it is believed that a large part of the answer lies in the greatest single cause of death on the highway—excessive speed—which is an all too familiar phenomenon of the wide-open rural highway, but a relative rarity on crowded city streets."

The article cites insurance company figures which show speeding last year accounted for 46% of the fatalities traceable to driver failure. Other prevalent driver errors leading to fatal accidents are listed as driving on the wrong side of the road, 19%; reckless driving, 15%; not having the right-of-way, 8%; going off the road, 7%; and other causes, 5%. To reduce the accident toll on highways, the oil industry in its Highway Policy adopted last year called for a comprehensive and well-balanced highway safety program. In this connection, the APIC cites a statement by Paul Blaisdell of the Association of Casualty and Surety Companies that "the issue in highway safety is no longer technological, but psychological and sociological. The modern, smooth, straight, almost endless highway tempts the driver to push his car beyond the limit of human ability to control. . . . Human engineering must be on a par with highway, traffic and automotive engineering, not the unwelcome nuisance tagging along at the end of the procession."



X-ray tube (right) is connected by cables to control box (center). Note ropes, warning signs and red lights to mark safety zone.

# Planes Get X-Ray Exam

Portable X-ray unit is hoisted into position over the rudder trim-tab mechanism.

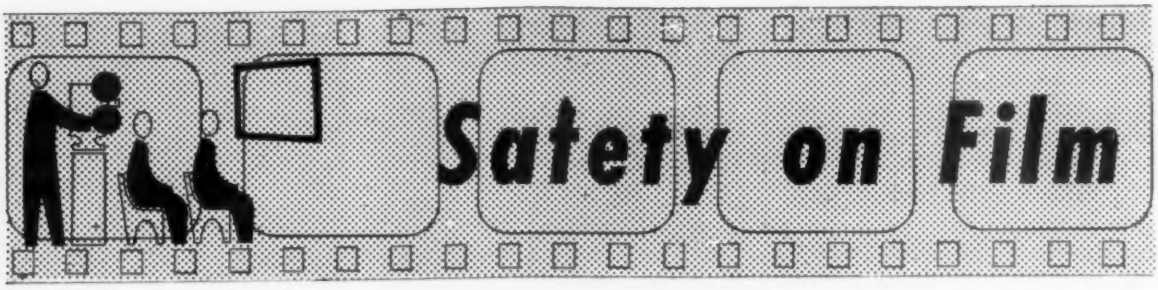
A PORTABLE X-RAY unit for swift, searching inspection of interior mechanisms and structural parts of aircraft is the newest aid in overhauling Mainliners at the San Francisco "push-button" maintenance base of United Air Lines.

Although smaller than standard medical X-ray units, the portable machine has greater penetrating power. It enables mechanics to examine relatively inaccessible areas, such as the juncture of wings and fuselage, without peeling away exterior metal "skin."

Concealed mechanisms of the landing gear and other components are easily eyed with the radiographic device. It also is used to peer into incidental parts, such as electric plugs, which, if opened, would be hopelessly damaged. Mechanics subsequently "read" the X-ray negatives.

Since overexposure to X-radiation is harmful, United permits no one but the protected machine operator to go near an aircraft undergoing X-ray inspection. The area is roped off, posted with danger signs and marked with red lights.

Pictures by courtesy of United Air Lines.




## New Film Features Waterless Washing

A NEW FILM, sponsored by the National Association of Manufacturers, includes the story of one of the newest of industrial developments . . . washing without water. The film covers the development and production of a waterless skin cleanser and the use of waterless washstations or dispensers.

Several new films on the subject of Waterless Washing in industry are now in production and will soon be available to all interested parties upon a written request to the Sugar Beet Products Company, Saginaw, Michigan.

## Drivers of Tomorrow

A TEN MINUTE DOCUMENTARY, "Tomorrow's Drivers," narrated by Academy Award winner James Stewart, shows what one city has done to attack the problem of traffic accidents by getting right at their principal source: the driver. From the first grade on in Phoenix, Arizona, the driver education program teaches the city's children through demonstration. On painted table tops with streets and crosswalks indicated, tiny cars help beginners develop an awareness of the rights of others and the need for rules and regulations to protect those rights.

Children of Phoenix's Garfield Elementary School are caught by cameramen as they play the parts, in the advanced courses, of pedestrians, motorists and traffic cops on miniature streets complete with traffic signals, stop signs and safety lanes. The film is currently available to PTA's, civic and service groups through Chevrolet Dealers all over the country. For information concerning showings contact a Chevrolet Dealer.

## Fireproof Canvas Film

THE FREE-LOAN color motion picture "Flamefoil Canvas Protection" is once again available through The Princeton Film Center, Inc. It offers a dramatic demonstration of the safety and serviceability features of fire, mildew and water resistant canvas which may be utilized in industrial or public service operations—features which the film clearly illustrates under varying climatic conditions and situations. It is highly informative without being too detailed or technical.

The film is sponsored by The Philadelphia Textile Finishers, Inc., and is available free-loan from The Princeton Film Center, Inc., Princeton, New Jersey.

## Fire Inspection Documentary

NATIONAL BOARD of Fire Underwriters has recently released a new 16 mm. color film, "Before They Happen," which deals with a typical day's work in a fire inspection bureau. The fire inspection bureau of Hartford, Conn. is depicted in the film and the leading role—a true-to-life portrayal—is played by Fire Marshal George Kennedy, with the fire department 19 years.

The idea of the new film developed as a result of numerous requests by fire chiefs for a film that effectively would relate the work of fire department's fire prevention activities to the fire safety of the individual owner. Accordingly, the new film sets about to do these four things: 1. Develop greater public understanding and appreciation of the service of municipal fire prevention bureaus; 2. Stimulate greater public regard for the importance and need of fire prevention by showing the firemen's devotion to his inspection activities; 3. Promote more fire inspections by fire departments which do not already have fire prevention bureaus; 4. Educate the home or plant owner in fire prevention techniques through demonstrations shown by fire prevention experts.

The National Board of Fire Underwriters now has a film library of 27 films covering many aspects of fire prevention. They are available for free public use on request to the Bureau of Communication Research, Inc., 13 E. 37th St., New York 16, N. Y.

## Water Pollution Film

A NEW VERSION of "Clean Waters," a film calling attention to pollution of water resources, has been produced by the General Electric Company. Latest in the company's More Power to America series, the 25-minute, full-color, sound motion picture is designed to create an awareness to the growing menace of stream pollution and enlist public and industry support for programs geared to meet the problem.

Dramatizing the importance of clean water to the individual and his community, the 16 mm. film outlines the need for immediate action to combat existing and future pollution areas in order to assure safe water for health and recreational purposes.

**Maintenance Show**

*(Continued from page 30)*

head expenses of maintaining the lighting system; it always improves performance of the lighting—saves money by reducing the cost per unit delivered.

"Mass replacement of all lamps, after reasonable service, even though they are not burned out, creates an important money-saving due to labor costs. New lamps give more light than those which have burned several hundred hours."

James M. Weeks, Plomb Tool Company, Los Angeles, said, "It has been predicted in the not-too-distant future some metal working plants will have one huge complex production machine. There will be a carload of steel rolling in at one end and truckloads of finished products rolling out the other. In between, there will be a half dozen production operators and a hundred maintenance men."

R. C. Sullivant, Exchange Lemon Products Company, Corona, Calif., said, "The citrus industry is constantly faced with corrosive acids which must be steam-cleaned, creating damp conditions affecting lubricants. Three men are employed (in this plant) for continuous lubrication who act as continuous equipment inspectors. Their daily reports have averted many shut-downs.

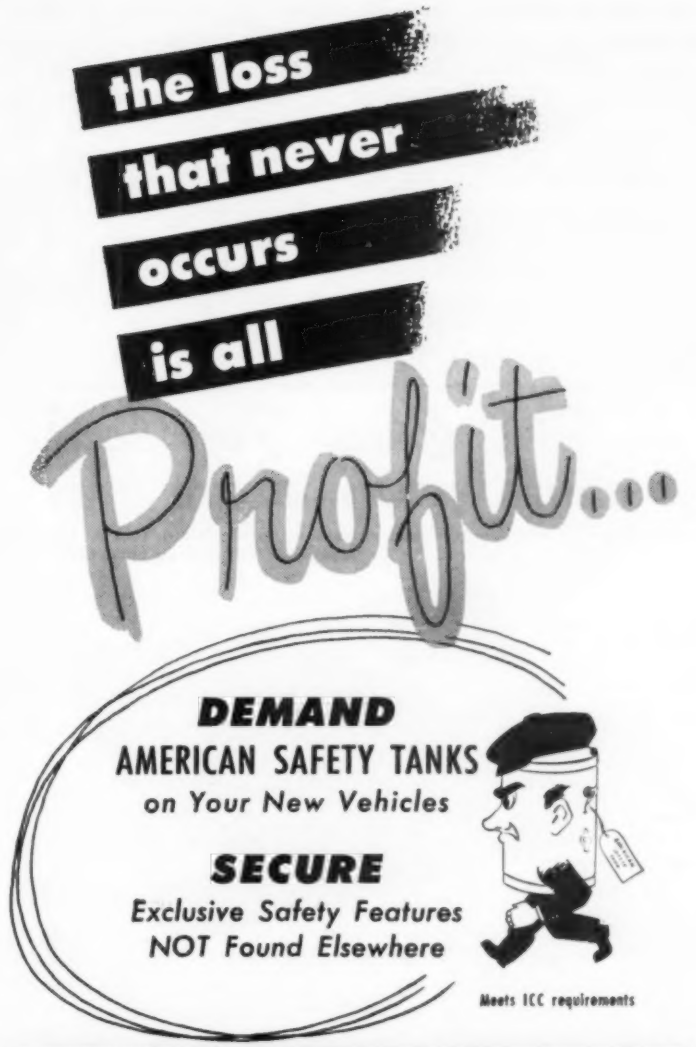
"Types of lubricants were reduced to the least number that could do the job, which saved many man-hours of walking to different lubricant stores and saved a great deal of room space, as well as lower financial investment in lubricant stocks."

J. S. Hutchison, Exchange Lemon Products Company, Corona, Calif., said, "Today's trend is toward higher speeds, greater capacities, more production, less down-time, and lower costs. This places added strain on man and machines with attendant emphasis on good maintenance, careful planning and better materials of construction. We enjoy a very good insurance rate because most of our buildings are equipped with automatic sprinklers.

"Some of the corrosive chemicals we store and handle are concentrated $H_2SO_4$, muriatic acid, liquid $SO_2$, isopropyl alcohol and aluminum chloride. For handling these materials and products during manufacture, we have equipment fittings and fasteners made of inconel clad steel, monel, everdur, the hasteloys and illium. Do not be misled by fantastic claims of manufacturers of wonder paints and coatings. Run tests of your own under your own peculiar conditions."

Philmore Belsky, Westinghouse Electric Corp., Los Angeles, said, "Maintenance can be designated 'preventative maintenance' when it is performed often enough so that repair work on the equipment is not found to be necessary or serious."

Art Zobell, North American Aviation, Inc., Los Angeles, said, "Centralized lubrication and special automatic application, where feasible, should be considered. Hand applications should be used only


(For details, use Key # X-56 on card on page 99)

where other means are not workable. The proper application equipment is just as important as the lubricant."

J. M. Forrest, The Dow Chemical Company, Pittsburg, Calif., said, "Our policy is that of up-grading employees. Obviously, a well organized training program is the only intelligent economic answer to this situation. The general format of the training courses calls for any man entering any of the central shop groups to enter the course immediately upon entering the shop. His training covers a 2½ year period, consisting of five sections of 23 lessons each. As the men complete each six months period they are advanced in return. The program is under the combined direction of management and the union. Instruction is by the Chief of the individual department in planned courses designed for problems of the individual plant. This has the advantage of the instructor being able to follow through in on-the-job checkups on the employees."

B. L. Peak, Sterling Electric Motors, Inc., Los Angeles, said, "Many companies have failed as businesses due almost entirely to the lack of maintenance. This usually takes several years. However, I have known companies which have started out with reasonably good equipment and have shown profits but have failed to replace or repair this equipment at the rate it was deteriorating. Eventually, the loss of productive hours will begin to gnaw at profits."

### Lubrication Problems

James Frier, Kaiser Steel Corp., Fontana, Calif., said, "The term 'wasted' does not apply to the surplus lubricant showing on the outer side of a bearing where it is necessary to flush same. There is such a thing as lubricant being too stable and has a tendency of throwing away from the bearing surfaces and packing in the cavities of a bearing. I prefer the type of lubricant that will flow through and this cannot be considered waste. Waste can only be referred to as that product of which no lubrication value is received."

C. M. Vigil, Douglas Aircraft Co., Inc., El Segundo, Calif., said, "Our preventive maintenance procedure includes a complete lubrication procedure. When a machine tool is placed in production a lubrication engineer reviews all information available from the manufacturer and makes a Master Lubrication Card for the machine. A card is filled in and installed on the side of the machine in a transparent envelope. The corresponding lubrication points on the machine are painted to show the oiler which receive daily, weekly, semi-monthly and monthly attention.

"We have 30 cranes and over six miles of crane rails which require frequent inspections. Some of the cranes handle complete airplanes and the small cost of inspections is nothing compared to the amount of damage that would be done if an airplane were dropped."


"Fire-Chief Finished"

WELDING CURTAINS—SALVAGE COVERS

to confine the welding operation to a given area

used to protect machinery, and other equipment from water, dust and snow.

MADE OF CANVAS

*impregnated with Hooper's Fire Chief treatment under their patent which carries the Underwriters' Laboratory seal.*

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MANUFACTURERS OF REEVES STRETCHER

Ridge Ave. at Green — Philadelphia 23

"If It's Made of Canvas, We Make It"

(For details, use Key # X-57 on card on page 99)

For Safety's Sake . . .
Buy GOLD SEAL

HICKORY HANDLES

- ★ Long and Hard Service
- ★ Triple Inspected
- ★ Made Only with Second Growth Hickory
- ★ Greater Strength - Less Breakage
- ★ Perfect Shape
- ★ Smooth Wax Finish

Eye end of each handle is slit for wedge, for which metal and wood wedges are included — at no extra cost. Sold only through your jobber salesman.

Manufactured by

LA PIERRE-SAWYER HANDLE COMPANY

Jackson, Missouri

(For details, use Key # X-58 on card on page 99)

H. M. Eversz, McCulloch Motors Corp., Los Angeles, said, "In the building of additions to the plant, we were able to set up a unique oil house and we tied in the salvage and dispensing of all liquids used in the plant. This included salvage of hydraulic oils and cleaning solvents, as well as scrap metal and waste disposal. Solvents had been dumped and used oil sold for two cents per gallon. The savings in the first nine months of the new program paid for all costs of oil house, waste bins, stills and filters. In fact, our preventative maintenance report for May, 1954, shows a total liquid reclamation savings of $1,031.60."

Arthur E. Storm, Tide Water Associated Oil Co., Associated, Calif., said, "The basic premise of this centralized planning and scheduling system is to provide eight hours of work every day for each man in the department. No speed up of the men is involved—all that has been done is to enable the men to work more efficiently. This increase in efficiency has much more than offset the cost of the planning and clerical personnel required.

"Approximately 85% of all work by the M & C Department (Maintenance and Construction) is planned on a daily basis. All work is specifically authorized. No work is done by the M and C Department unless it is authorized in writing. Unless there is an emergency, verbal or telephone requests are not honored and emergency requests must be confirmed in writing.

"Process unit shutdowns for the refinery are scheduled on a yearly basis with quarterly revisions. The Superintendent of the unit to be shutdown gives the Project Planning Office a list of all anticipated work 3 to 4 weeks before the shutdown. The target is for the Plan to be completed 1 week prior to the shutdown. The final week is used for briefing the personnel who will supervise the shutdown."

The serious attention evidenced in the 3 sessions and the down-to-earth content of the discussions indicates that next year's attendance will reach the 600 mark, according to Morrow.


*World's Largest and Foremost Manufacturers of—*

- SAFETY EMBLEMS
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*and Incentive Awards*

**An IDEAL Plant or Department Safety Award**

GC-3 PLAQUE . . . Beautiful two-tone jewelers bronze etching mounted on a genuine walnut shield. 7¾" x 7¼" —$6.50

NEW! Industrial Awards Catalog will soon be off the press. Reserve your copy NOW!

1933 series is available in over 40 titles. ¼ in. diameter, hard glazed enamel, heavily gold plated pin and safety lock catch. $10.50 doz. (plus F.E.T.)

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(For details, use Key # X-59 on card on page 99)

**SEARJEANT *Safety* GUARDS**

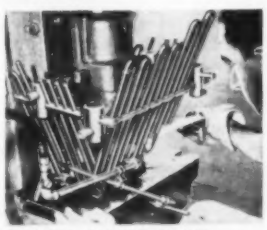
FOR *PUNCH PRESSES*

Fit any Press

30 DAY FREE TRIAL

SWEEP GUARD

Guards to fit all types and sizes of punch presses. Single and double sweep arms available. Hardened wearing parts assure years of trouble free service. Send for Bulletin H.



ADJUSTABLE BASKET GUARD

Enclosure type guard, used for blanking and other first operation work, prevents operator from reaching in or coming in contact with moving die. Easily installed on any make punch press. Also available with clear plastic window. Write for free catalogs.

Other Guards Designed and Made by Searjeant
End Zone Barrier Guard • Enclosure Guard for Milling Machines • Non-Repeat Mechanism

**SEARJEANT METAL PRODUCTS, INC.** No. 12 Pittsford Rd., Mendon, N.Y.

(For details, use Key # X-60 on card on page 99)


## Housekeeping Show

FRESH IDEAS, PRODUCTS and methods will be presented to visitors to the annual convention of the Eastern Sanitary Supply Group, to be held this year in Atlantic City, according to William F. Plowfield, the director. The trade show, sponsored by the Industrial Housekeeping Safety Guild, Inc., is scheduled for the Ambassador Hotel, beginning Sunday, November 7th and running through Thursday, the 11th.

One of the many features of the event, which will include hundreds of exhibits, a series of panel discussions, a banquet and floor show, will be a symposium led by "Bram" Levy, newly elected president of the Guild, and devoted to proposals for modifying, or adopting in its present form, the Guild's proposed seal of approval for sanitary-equipment products.

# What's New...

**For your convenience in obtaining descriptive literature of products listed here, use the Reader's Inquiry Card. Just write in the code number given with each item. Or send written requests to:**

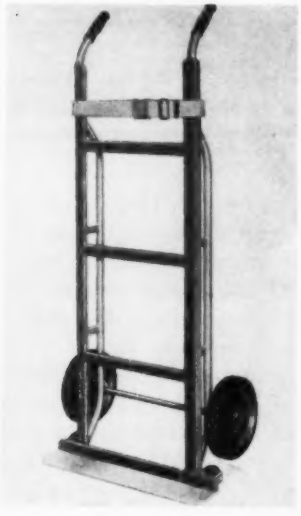
**Service Dept.,**
**SAFETY MAINTENANCE & PRODUCTION**

## APPLIANCE TRUCK

**(Use Key # 690 on Inquiry Card on page 99)**

ADDITION of a new labor-saving appliance truck to their line of commercial and industrial hand trucks is announced by the Hamilton Caster & Mfg. Co. The new truck is rigidly constructed of lightweight steel and will not twist or bend under heavy loads. It is equipped with extra-large pneumatic tires—10 x 3.50—which ride stairs and curbs easily. Long smooth runners make the use of skids unnecessary.

According to the manufacturer, the truck is accurately balanced so that load weight rests squarely on the wheels, never on the operator. To provide maximum lifting leverage without strain, the operator stands between the handles rather than behind the unit as in conventional design. The truck, not the operator, carries the load. For maneuvering in narrow hallways and other cramped quarters, the truck is equipped with small hard-rubber rollers at the base of the frame. These rollers, together with the regular wheels, cradle the load for easy handling in the upright position. Additional features include thick felt padding on the frame, rubber handle grips, and a 15-ft. heavy web strap with self-locking buckle (extra straps available).



## ANTI-FOG LENS CLEANER

**(Use Key # 691 on Inquiry Card on page 99)**

A DOUBLE-DUTY product which, immediately after application, cleans as it defogs protective goggles, masks, and other glass and plastic surfaces. Called Klear-Glass and developed by the Buckley Corp., the product is said to make these surfaces fog-free, steam-free, dust resistant and optically brilliant for several days, eliminating manual wiping of glasses and providing greater safety by encouraging the use of protective eyewear.

Containing no glycerin, silicone or grease, the cleaner is available in a refillable self-dispensing wall cabinet, an individual pocket applicator, and in 1½ and 3½ ounce spray bottles for quick spray application to truck fleet windshields, windows, and mirrors.

## LADDER STABILIZER

**(Use Key # 692 on Inquiry Card on page 99)**

A LADDER attachment, called Sky Hook, is said to increase the stability and utility of a ladder. It consists of a pair of tubular steel arms connected by a bearing board and clamping to the siderail and top 2 rungs of a ladder. The bearing board, 32" long, gives a flat 93 square inches of bearing surface as compared to the 2 points of a ladder in normal use. In the industrial plant, the attachment on the end of a ladder minimizes swaying and shifting, increases the working length of a ladder and provides safety rails for getting on and off roofs and other projections. The ladder is held away from the work surface so the workman can see what he is doing from a safe, comfortable position. Lake Zurich Metal Products Div. Clayton Mark & Co.

## STORED PRESSURE EXTINGUISHER

**(Use Key # 693 on Inquiry Card on page 99)**

STORED PRESSURE fire extinguishers of smaller capacities have been developed by Stop-Fire, Inc. Called "Redi-Grip," they are pressurized with air or nitrogen and charged with either chlorobromomethane or carbon tetrachloride as the extinguishant—1 qt., 1½ qt., 2½ qt., and also 1 gal. capacities.

The stored pressure feature eliminates hand pumping in fire extinguisher operation. The extinguishant, held under constant 150 psi air pressure, is instantly discharged by release of a one-hand operated valve. The pressurized discharge carries up to 30 feet, regardless of the direction of discharge. The design permits one-hand operation from bracket to fire. A combination carrying handle and squeeze-grip operating valve makes it possible to grasp the extinguisher in one hand and, by squeezing the grip, release the extinguishant.

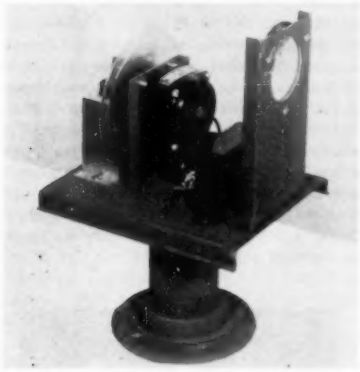
They are completely corrosion-resistant. The one piece seamless shell is of drawn 85–15 brass. Fittings are solid brass. Joints are silver-soldered. Other features include a patented safety pressure gauge that tells at a glance that extinguisher is pressured, ready to go; a safety seal that prevents accidental discharge; a plastic valve seat that acts as a positive seal against leakage. The extinguisher is approved by Underwriters' Laboratories, Inc. for Class B (flammable liquid) and Class C (electrical) fires. It also holds the first approval for small units granted by the U. S. Coast Guard. The design is based on the manufacturer's model which is now standard in the U. S. Air Force.

## OIL-RESISTANT SOLE

**(Use Key # 694 on Inquiry Card on page 99)**

A NEW extremely light resilient Micro-Cellular Neoprene Cork sole has been announced by the Vul-Cork Division Cambridge Rubber Company. The latest addition to their line of outer soles, which includes a combination of cork and rubber and a combination of cork and neoprene, entails the production of a live neoprene and cork structure having millions of tiny closed cells filled with nitrogen.

The cellular construction of this new sole, with its millions of tiny nitrogen-filled cells sealed with walls of live neoprene, gives a structure that will not absorb oil, water and other foreign matter—gives extreme lightness, extreme resistance to slipping—resistance to oil, heat, gasoline and acids—sufficient resiliency for extreme comfort with maximum safety—and a hardness sufficient to allow good stitching by machine or hand operations. Now in production, it has undergone complete wearability tests under all extreme conditions and is available in 21-iron flat with a buffed brown surface.



## MODULATED LIGHT RELAY

**(Use Key # 695 on Inquiry Card on page 99)**

A COMPLETELY new modulated light beam relay is announced by Electronic Control Corporation. Called Modulite, the control operates on pulsed rather than steady light so that it overcomes many limitations of ordinary "electric eyes." It is particularly useful on such applications as door openers, press and shear safety guards, conveyor controls, intrusion alarms, etc.

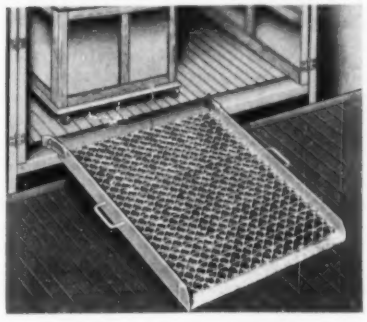
Light from the projector is pulsed several hundred times per second by a scanning disc with holes at its outer edge. The receiver is tuned only to this frequency by RC circuits and peaked transformer coupling. The unit cannot be triggered by ambient light changes or reflections, nor can it be "fooled" by a flashlight. Other new features include: (a) water-tight, dust-proof welded steel case for all-weather operation; (b) reduced voltage light source for extra long life; (c) plug-in, dust-tight relay with 5 amp. DPDT control contacts; (d) tilt and aiming adjustments on both projector and receiver; (e) 2-inch pipe stands for mounting; (f) infra-red filter as optional accessory.

## TOILET BOWL CLEANER

**(Use Key # 696 on Inquiry Card on page 99)**

A NEW TOILET BOWL cleaner called Sani-Tate has been announced by Huntington Laboratories, Inc. It is a milky white emulsion that cleans toilet bowls, urinals and similar porcelain items removing encrustations of lime and rust and eliminating odors. Porcelain toilets may be kept sanitary, clean smelling and brightly polished with this effective deodorant which itself has a clean smelling odor. The cleaner contains a special solvent that flushes away organic particles, grease, oil and gummy sludge. Although this solvent is quite powerful, it is safe for use on any porcelain.

Available in both quart and half gallon containers and packed twelve bottles to the case with six swabs included, the cleaner is said to offer an effective and economical means of cleaning and sanitizing toilet bowls and urinals.



## SAFETY LOADING RAMP

**(Use Key # 697 on Inquiry Card on page 99)**

A POSITIVE SAFE footing "Loading Ramp" has been introduced by Bustin Firm Grip Grating Corp. This new ramp is especially designed for use in the small incline from the loading dock to the truck body. The safety grating permits small industrial casters to roll over its surface easily. Lighter than conventional steel plates, the loading platform provides safe walking under the most adverse conditions due to grease, water, oil and ice. Built-in Swing-A-Way Safety Pins assure a non-slip grip. The long platform is made in two standard sizes, 30" by 27" wide and 30" long by 30" wide. Other sizes also available.

## MERCURY DECONTAMINATOR

**(Use Key # 698 on Inquiry Card on page 99)**

A NEW method for decontaminating surfaces exposed to mercury in any form has been produced by William M. Stieh & Co., Inc. A water soluble white powder, called HGX, may be applied in solution or powder form. The product creates a film over the finely divided globules of mercury which reacts to produce a non-volatile (sulfide) form. The same reaction takes place in rendering the derivatives of mercury—mercury salts, etc.—non-hazardous. Ingredients of the decontaminator are classified as non-poisonous. There are no odors, obnoxious gases or stains, and nothing is harmed that water will not harm. It is said to provide prolonged protection, in some cases even months after the original application.

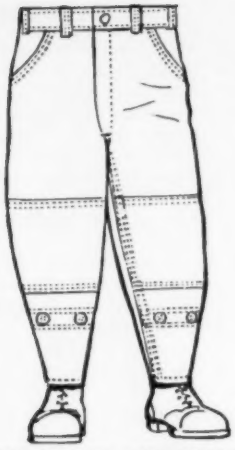
The decontaminator is suggested for use in all areas—open, confined, heated, air conditioned, etc. It may be mixed with water and applied to contaminated surfaces by spraying, washing or mopping, or may be applied in dry powder form by swabbing or sweeping into cracks or crevices. It may also be used in combination with saturated sawdust for periodic sweeping. Particularly recommended for rough surfaces such as wood floors with cracks, crevices or open joints (either solution or dry powder form), and for walls, ceilings and equipment (solution form).

## COLORED HARD HATS

**(Use Key # 699 on Inquiry Card on page 99)**

INDUSTRIES MAY NOW establish a hard hat color code with the new Aluminum Non-Fading Metallic-Colored Safety Hats and Caps offered by E. D. Bullard Co. Produced with special metal dyes, both the "Roughneck" and "Shorty" models are available in the following six colors: Yellow Gold, Bronze, Blue, Grey, Green, and the standard, Silver. Weather tests made with the new dyes indicate no fading after 1000 hours of exposure.

The 12 ounce "Roughneck" (Full Brim Aluminum Hat) and 10 ounce "Shorty" (short brimmed aluminum hat) are drawn from Aircraft grade aluminum and offer great strength combined with light weight. They pass all standard drop tests for impact resistance. Both are constructed with the three ribbed crown which adds greatly to the strength of the crown and increases the angles of deflection more than 100 times. The company's standard headband fits both models and is quickly adjustable to head sizes from 6⅝ to 7¾. There are no laces to thread, no tools of any kind needed.



## ZIPPER-LEG OVERALLS

**(Use Key # 700 on Inquiry Card on page 99)**

DESIGNED to eliminate "roping" overall legs, ankle elastics, buttons, tabs, and flaps to snag, zipper leg overalls and dungarees have been developed by Safe-Way Industries, Inc. When zipped down, the garment leg fits snugly and safely around the ankle—when zipped up, the leg is as loose as regular trousers for off-duty wear, and the zipper is concealed.

The garments are made of heavy-duty, long-wearing fabrics and have re-enforced multi-wear pockets. They have ventilating screen-type grommets for comfortable air circulation, and the zippers are guaranteed for the entire life of the garment. Overalls and dungarees bear seal of the American Institute of Laundering.

## NEOPRENE GLOVE

**(Use Key # 701 on Inquiry Card on page 99)**

DEVELOPMENT of an all-neoprene protective glove—called Neo-Sol—is announced by the Charleston Rubber Co. The manufacturer states that after laboratory tests and extensive on-the-job tests—including chemical resistance, tensile strength, puncture resistance, and swelling—the new glove compared favorably with other similar gloves tested.

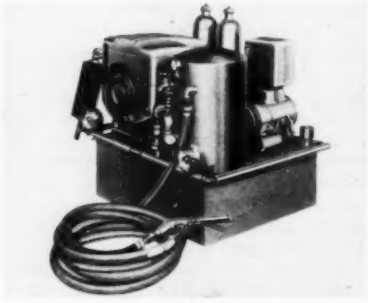
The glove is black with a red inner lining and a red roll at the cuff. It is made with curved fingers for easy, natural use and is available with either an anti-slip or smooth finish. It is being manufactured in five sizes, 7–11, four weights, and in lengths from 10½ to 18 inches.

## GOGGLE SANITIZER

**(Use Key # 702 on Inquiry Card on page 99)**

A CONCENTRATE which has been developed by the Chicago Eye Shield Co. mixes with water to form an effective disinfectant for sanitizing all types of safety glasses, goggles, and respirators which are not harmed by water itself. Called Cesco Disinfectant Concentrate, it is non-irritating to the skin and non-toxic in normal use. It is registered under section 4 of the Federal Insecticide, Fungicide and Rodenticide Act.

After sanitizing in a solution of the disinfectant, articles need not be rinsed, washed off, or wiped dry. Best results are obtained by simple air-drying of the items, after which they are said to be safe and ready for re-use. Available in 6-oz. metered bottles, one bottle will produce 24 gallons, and affords an economical means of sanitizing goggles.

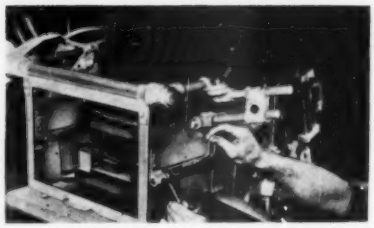


## FIREFIGHTING UNIT WITH EMERGENCY POWER

**(Use Key # 703 on Inquiry Card on page 99)**

PORTABLE fire-fighting apparatus, combining fire-extinguishing effectiveness with versatility of electric power, is announced by the National Alarms Corporation. Named Versatile Power, this multi-purpose unit is powered by a 3,500-watt, A.C. Onan electric generating plant. This gasoline-engine-driven generator is the "heart" of the apparatus, providing dependable power for the pressure pump and floodlights, and also serves as a source of portable or emergency electricity for communications, electric tools, etc.

The unit utilizes a chemical solution called Unox which is said to multiply the effectiveness of water from 10 to 20 times. It bears the Underwriters' Laboratory seal of approval for use on Class "A" and "B" fires. Suitable for such applications as civil defense where both auxiliary fire-fighting equipment and emergency electric plants are priority items for municipalities and villages where because of its portability and small size it can be used in various departments; for railroads where "VP" units can be mounted on a rail car and easily taken to the site of any trestle fire or similar emergency. No elaborate installation is necessary. The compact unit fits easily into the back of a standard jeep, making it mobile enough to fight fires in forests, oil fields and large industrial plants.



## PUNCH PRESS GUARD

**(Use Key # 704 on Inquiry Card on page 99)**

FOR FURTHER protection for punch press operators, the American Allsafe Co., Inc., has developed an air controlled die enclosure for presses limited to primary operations. The new enclosure features complete safety, faster set-up, easier die change, reduced fatigue and unobstructed view.

The strong, transparent window is quickly opened to allow fast, easy die changes or to adjust stock. While the window is open, press cannot be tripped. Opening the window automatically cuts off the air supply to the foot pedal valve and clutch cylinder by action of the cam-operated valve. The adjustable finger side shields can be set to envelop stock and die clamps, leaving no opening for fingers to enter die. One nut tightens or loosens all fingers in the side shield. Adjustment of the side shield to fit different strip stock and die size is quick and easy. The window is constructed of ⅛ in. thick Lucite which, while transparent and allowing a full unobstructed view of die space, also protects operator's face and eyes from flying particles resulting from improper die setting, etc.

## NEW TRAFFIC MARKER

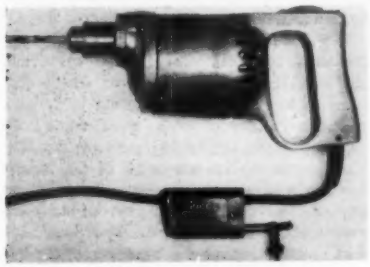
**(Use Key # 705 on Inquiry Card on page 99)**

A NEW type of traffic marker for marking lines on plant, warehouse, garage and office floors, made of a tough, long-wearing plastic material, has been announced by the Armor-Flex Co. Called Armor Flex Traffic Markers, they are 3" x 6" x .02" in size, bright yellow in color, non-absorbent and resistant to most solvents. They are quickly and easily installed with an oil-resistant adhesive in a variety of designs depending on the job to be done, for indicating aisles, clearance lines, storage zones, and similar types of marking on wood, concrete, asphalt or composition floors. The floor is not harmed in any way: no drilling, no spikes, no countersinking.

## SEWAGE DEODORANT

**(Use Key # 706 on Inquiry Card on page 99)**

A NEW PRODUCT called Cifon, N. Y. has been developed by Fine Organics, Inc. It is said to effectively control foul odors emanating from the handling of raw sewage sludge—a condition that commonly prevails in sewage treatment plants. After extensive tests, it is claimed that only 2 gallons is required for every 9,000 gallons of raw sewage sludge to eliminate the foul odors satisfactorily.



## SAFETY SWITCH AND CHUCK KEY HOLDER

**(Use Key # 707 on Inquiry Card on page 99)**

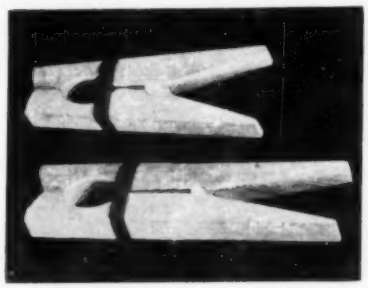
A THREE PURPOSE electrical switch, the Tricop safety switch & chuck key holder, which is said to cut production costs, reduce equipment loss, and practically eliminate the "human factor" of accidents in industrial and home drill operations, has been improved by the Tricop Co., Inc. The chuck key, usually found attached to the cord near the junction box as a safety precaution, but quite often unattached and frequently lost or misplaced, must be inserted into the switch in order to close the electrical circuit to the drill. The important safety factor is that current cannot pass through the line when drill changes are being made, as the chuck key must be replaced into the switch before the drill can be operated. Small and compact in size (3" x 1⅞" x ⅞") the new switch fits all types of drills up to and including a half inch chuck, stationary or portable. It has tension rings enclosed for cords and an enclosed Underwriters' Laboratories approved circuit breaker as part of its new design. The switch, as well as being available for existing equipment, may be used as an optional feature on certain new equipment.

## MAINTENANCE TRUCK

**(Use Key # 708 on Inquiry Card on page 99)**

A MOBILE, self-propelled work-shop on wheels, which carries maintenance tools, supplies, parts, equipment right to the job, has been introduced by Stahl Metal Products, Inc. Powered with a geared-down Briggs & Stratton 1½ H.P. gasoline engine, the Shopmobile boasts an automatic rewind starting cord and a steering handle which also actuates the clutch when lowered to "moving" position, de-clutches when raised, applies the parking brake when returned to the vertical position—a convenient arrangement for easy and safe operation, even where slight grades are encountered or in narrow crowded aisles. Clutch can be disengaged with control on steering handle for easy manual movement when necessary.

The truck will carry up to 800 lbs. of materials, tools, and equipment to the job in its side compartments and center "bulk load" compartment. It operates for hours on one quart of gasoline. Other features include V-belt and chain drive, roller bearings, pneumatic-tired caster type driving wheel, and semi-pneumatic main wheels under body. Ruggedly constructed for long trouble-free service, the truck also has work-bench surfaces of checker plate steel at working height on top of side compartments, which may be fitted with vises, etc.



## LINEMAN'S BLANKET CLAMP

**(Use Key # 709 on Inquiry Card on page 99)**

A NON-METAL clamp for linemen's rubber blankets which can be applied easily and quickly yet offers protection has been designed by the Surety Rubber Company. The clamp is a modification of an earlier model and is now being manufactured in two sizes—7½ inches and 10½ inches—both designed to fit comfortably in a lineman's glove.

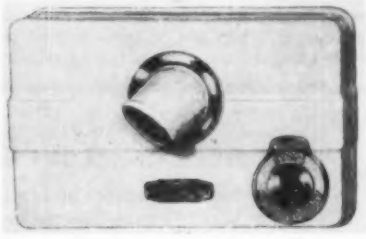
Made completely of wood, with the exception of three bands of rubber which furnish the spring action, the clamp contains no metal to conduct current or to interfere with its serviceability. The jaws are of smooth finish, close-grained poplar, and work on a wooden spool fulcrum. The clamp is available with or without a dowel pin on the lower jaw. The pin is made to fit into the blanket holes but many linemen prefer the smooth jaw to permit clamping onto any part of the blanket. Tension for holding the jaws in place is furnished by three replaceable bands of super-aging rubber grooved into the clamp so they cannot slip out of place.

## SNAKE BITE KIT

**(Use Key # 710 on Inquiry Card on page 99)**

TO PROVIDE instant snake bite first aid for field workers, Medical Supply Company has adapted the widely used, tested, and proved Saunders Snake Bite Kit for use in unit type first aid kits. The kit contains a suction syringe for the extraction of venom, along with a constricting band, lancet, ammonia inhalants, iodine swabs, and adhesive bandges—all of the items necessary to render fast and effective suction treatment for snake bite.

The suction syringe and kit are made of Tenite plastic for durability, and clear plastic syringe adapters of various sizes permit constant inspection of the fluid being extracted. The suction syringe is made with surgical precision, and it permits controlled suction and ease of operation by the victim alone if necessary. The kit requires three unit spaces in unit type kits. Also, it may be carried on the person in single or double belt carrying pouches of various grades. A companion first aid packet is also available in the same size matching plastic case.

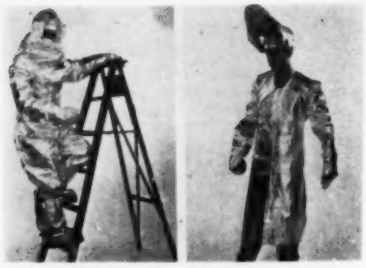


## ELECTRIC HAND DRYER

**(Use Key # 711 on Inquiry Card on page 99)**

PRODUCTION OF AN improved semi-recessed electric hand dryer is announced by The Chicago Hardware Foundry Company. This improved Sani-Dri electric hand dryer is said to give faster drying with an improved heating element and a nozzle which concentrates the air stream from a large blower and motor. A new circuit-breaker prevents damage when someone places his hand on the air intake or nozzle. The circuit-breaker shuts off the heating element, but automatically makes contact again when the hand is removed. Instant starting is provided in an easy-to-operate starting switch. A new simplified timing device shuts the machine off automatically.

The dryer is built to give long service with its cast iron frame and case, with porcelain enamel finish. It modernizes washrooms by providing 24 hour automatic drying service, as well as saving towels and the expense of washroom maintenance.



## HEAT AND FLAME RESISTANT CLOTHING

**(Use Key # 712 on Inquiry Card on page 99)**

A FIRE REPELLENT fabric constructed to protect against flames and radiant heat temperatures up to 2500 degrees F. has been announced by the Far-Ex Corp.

Called Fyre-Armor, the fabric, available in suitings and protective equipment, is made by fusing flame resistant fabrics to metallic layers, topped by specially treated aluminum foil, which has high reflective powers. It is suitable in industries where high radiant heat is a problem and where men are hampered in the performance of their jobs in the face of high heat. It is also suitable for fire fighters and rescue workers.

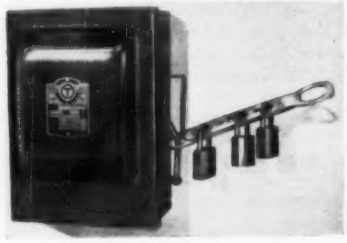
The lightweight suits, which come in some ten models, weigh only from 5 to 10 lbs.—offering ease of movement and mobility in action (the temperature inside the suits never rises above normal body temperature). No special underclothing or additional protective equipment need be used. The fabrics can be sewn into tailored garments for many purposes as well as into gloves, protective covers, tarpaulins, tents, face shields, machinery covers, etc.

## SAFETY MULTIPLE LOCKOUT

**(Use Key # 713 on Inquiry Card on page 99)**

FOR ELECTRIC switch and fuse boxes, Industrial Products Company announces a new lockout device. Used as a safety procedure when several men are working on machines and equipment controlled by a common switch box, the device prevents others from throwing the switch until the line is clear. Allows up to six padlocks and operation current may not be turned on until the last man has completed his work and removed his lock.

The lockout is fabricated of cold rolled



steel, zinc iridite plated. It opens and closes in scissors fashion, jaws at either end providing a secure lock around switch levers, handles and lock holes. Weighs 10 ounces and is 8¼" long.

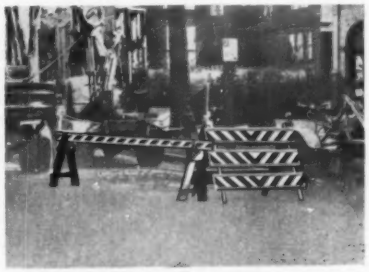
## PAINT ROLLER COATERS

**(Use Key # 714 on Inquiry Card on page 99)**

TWO entirely new paint roller coater assemblies including a precision built lightweight coater featuring plastic caps and bearings plus a self-adjusting aluminum fin cylinder, have been developed by the Pittsburgh Plate Glass Company. The first of these products is the deluxe Gold Stripe roller which has no parts to rust or corrode. Smooth, silent, easy action, is provided by solid plastic bearings that will not mar surfaces. It has a removable cover with a phenolic impregnated fiber core bonded with pliobond. The cover will withstand immersion in paint solvents, cleaners and soap and water up to 24 hours. Covers may be easily changed from one paint to another without cleaning. They are furnished in a choice of wool, mohair or dynel. All have a denser fill than average roller covers to provide better paint carrying capacity and maximum speed performance without spattering.

The deep-drawn one-piece metal tray designed for both Gold Stripe and Red Stripe rollers has no seams or sharp corners. It features a rolled safety edge and a large reservoir with quart-and-a-half capacity. A specially designed distribution panel prevents excessive fill of the roller. The shallow end of the tray is deeper than any now on the market to prevent slopping over while carrying. A dual-purpose support bracket provides a sturdy rest for the tray both for attachment to ladders or for use on flat surfaces.

The new Red Stripe roller features specially treated cardboard cores resistant to softening during average use or cleaning. End cups are deep-drawn metal with rolled edges and brass bearings. They are attached by an easily accessible wingnut. Covers come in a choice of wool, mohair or dynel fabrics. Any standard cover may be used.



## SELF STICKING WARNING STRIPES

**(Use Key # 715 on Inquiry Card on page 99)**

BRILLIANT, diagonally-striped warning signals in quick-to-apply, self-sticking tape form are announced by W. H. Brady Company. Called Brady Warning Stripes, they can be applied to dangerous equipment and in hazardous areas in place of hand-painting and stencilling. They are applied permanently to any clean, dry surface without moistening. The user can mark barricades, low or narrow creaways, elevator gates, pillars, electrical apparatus and trucks in seconds.

The stripes are stocked on rolls, 1", 1½", 2" and 3" wide, and are available in three bright color combinations: Yellow and Black Stripes; Black and White Stripes; and Red and White Stripes. They are made in three different self-sticking materials: acetate plastic, recommended for indoor applications; polyvinyl plastic for outdoor applications and in areas where there may be dirt, grease, oil and solvents; and Scotchlite reflective material for warning signals with brilliant reflection.

# What's YOUR Problem?

- **Has an accident or fire interrupted production?**
- **Want to know how to prevent it?**
- **Do you need background information on equipment for industrial safety, hygiene, or maintenance?**

*As a service to its readers, "Safety Maintenance" will arrange to supply manufacturers literature on the following subjects. Just insert the key number on the Readers Inquiry Card on the opposite page and be sure to fill in your name and address. If you need information on a specific type of product, simply write it in on the Inquiry Card.*

| Key Number | Subject |
|---|---|
| 101 | Safety Goggles |
| 102 | Face Shields |
| 103 | Lens Cleaning & Anti Fogging Equipment |
| 104 | Sweatbands |
| 105 | Hard Hats |
| 106 | Respirators & Masks |
| 107 | Protective Clothing |
| 108 | Women's Protective Clothing |
| 109 | Safety Belts |
| 110 | Safety Gloves |
| 111 | Safety Toe Shoes |
| 112 | Safety Boots |
| 113 | Wooden Sole Shoes |
| 114 | Anti-Slip Soles |
| 115 | Oil-Proof Soles |
| 116 | Welding Helmets |
| 117 | Welding Curtains |
| 118 | Protective Skin Creams |
| 119 | Skin Cleansers & Soaps |
| 120 | Hand Drying Equipment |
| 121 | Sanitary Drinking Cups |
| 122 | Athlete's Foot Control |
| 123 | Salt Tablets |
| 124 | Noise Control |
| 125 | Antiseptic Medication |
| 126 | Burn Medication |
| 127 | First Aid Kits & Supplies |
| 128 | Stretchers & Litters |
| 129 | Resuscitators |
| 130 | Portable Ventilators |
| 131 | Dust & Fume Collectors |
| 132 | Carbon Monoxide Control |
| 133 | Fire Extinguishers |
| 134 | Safety Cans |
| 135 | Fire Pump Equipment |
| 136 | Alarms & Warning Lights |
| 137 | Safer Solvents |
| 138 | Flammable Liquid Pumps |
| 139 | Explosion-Proof Lights |
| 140 | Safety Gasoline Tanks |
| 141 | Anti-Slip Flooring |
| 142 | Anti-Slip Waxes & Finishes |
| 143 | Floor Cleaning Products |
| 144 | Floor Machine Equipment |
| 145 | Oil & Grease Absorbents |
| 146 | Paints |
| 147 | Ladders & Safety Devices |
| 148 | Scaffolds |
| 149 | Work Platforms |
| 150 | Fluorescent Lamp Guards |
| 151 | Machine Guards |
| 152 | Power Press Feeders |
| 153 | Safety Signs |
| 154 | Aisle Marking Equipment |
| 155 | Safety Awards & Emblems |
| 156 | Employee Safety Guide |
| 157 | Hand Tools |

# FREE BULLETINS & CATALOGS

**As a convenience to executives, these new publications of manufacturers are offered by the Reader Service Department of SAFETY MAINTENANCE & PRODUCTION. To obtain copies write in the key numbers on the free-postage card below.**

## BUILDING MAINTENANCE

**Floor Treatments** ..... **487**
Hillyard Chemical Co. 7-page illustrated booklet gives answers to specific problems in caring for cement, terrazzo, asphalt, linoleum, rubber, vinyl or latex composition, wood and other special type floors. Tells how products should be used.

**Oil Absorbent** ..... **488**
Wyandotte Chemicals Corp. Circular describes use of all-purpose, fire resistant oil absorbent by many industries in reducing slippery floor and fire hazards. Includes instructions for use.

**Tubular Scaffolding** ..... **489**
Brainard Steel. Principle of assembly, using slip-fit arrangement, many applications, and all parts of scaffolding system covered in 12-page booklet. Ease and speed of construction featured.

**Floor Materials Selector** ..... **490**
Multi-Clean Products, Inc. A handy device which, when turned to concrete, terrazzo, wood, linoleum, asphalt tile or rubber tile, shows products and specifications for floor surface desired. Reverse gives description and packaging information on products.

## PERSONAL HYGIENE

**Drinking Water Service** ..... **491**
U. S. Envelope Co. Paper cups, with or without imprinted safety messages, cup dispensers, portable water tanks, stationary water tanks subject of bulletin. Specifications and advantages to personal hygiene noted.

**Electric Hand Dryer** ..... **492**
Chicago Hardware Foundry Co. Bulletin gives standard specifications, installation and maintenance instructions for electric pedestal, wall, and semi-recessed wall hand dryers. Includes comparative cost breakdown with paper towels.

**Noise Control** ..... **493**
Harmon Hosmer Scott, Inc. 16-page booklet features reprints of two articles on the general problem of industrial noise. Has several catalog sheets giving details of instruments for the measurement and analysis of noise and vibration.

## PERSONAL PROTECTION

**Protective Clothing** ..... **494**
Surety Rubber Co. A unique bulletin which lists clothing manufactured by company and includes swatches of the materials used with explanation of type of service recommended for each. Aprons, spats, leggings, gloves featured, in plastic and coated plastic.

**Spectacle for Respirator Wear** .. **495**
Willson Products, Inc. Bulletin features safety spectacle designed for use with respirator. Has a hinged bridge and is available in several styles with or without tinted lenses.

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**Linemen's Safety Equipment** .... **496**
Miller Equipment Co., Inc. 32-page catalog shows complete line of clothing, belts, tools, and accessories for linemen. Specifications given for all products and belts listed by occupation for which suited.

**Safety Clothing** ..... **497**
Pulmosan Safety Equipment Corp. Line of gloves, aprons, coats, pants, etc. in asbestos, leather, flame resistant duck and plastic shown in 9-page catalog. Contains guide for use of clothing by occupation.

## AIR CONTROL

**Air Filter** ..... **498**
Mine Safety Appliances Co. 4-page bulletin describes and illustrates the construction and function of a filter for air purification. Used in product and process control as protection against inert and radioactive dusts and for health protection where employees are exposed to toxic dusts, fumes, and vapors.

**Vapor Collector** ..... **499**
Aget-Detroit Co. Bulletin shows how mist from centerless grinders controlled by individual unit type vapor collectors suspended from ceiling. Collected coolant returned directly to sump of machine.

**Dust Collectors** ..... **500**
Pangborn Corp. Unit dust collectors, self-cleaning dust collectors, and cloth bag dust collectors subject of bulletin. Advantages of each pointed out and examples of specific installations in varied fields shown.

## FIRE PROTECTION

**Liquefied Petroleum Gas** ..... **501**
Ansul Chemical Co. 4-page technical bulletin recommends fire protection of liquefied petroleum gas storage, unloading, and processing areas. Methods of extinguishment in the event of fire outlined, and equipment necessary to do the job listed.

**Bench Can** ..... **502**
Protectoseal Co. Specifications, uses, and advantages shown in bulletin of a machine bench can located at the work bench for washing machined parts. Has a dasher which acts as a flame arrester.

**Dry Chemical Extinguishers** ..... **503**
Randolph Laboratories, Inc. 4-page catalog of a line of dry chemical extinguishers. Gives complete specifications and describes 6, 12, 20 and 30 lb. models with 35 foot range, and push-button release. Accessories such as refills and brackets also shown.

## MISCELLANEOUS

**Safety Signs** ..... **504**
Stonehouse Signs, Inc. Bulletin features signs to promote good plant housekeeping. Has sample sign to be detached and used, along with information on similar permanent signs painted on steel.

**Solvents** ..... **505**
John B. Moore Corp. Reprints of an address giving 7 rules for determining the

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W. H. Brady Co. Self-sticking pipe markers with a variety of printed legends discussed in bulletin. Sticks to pipes from 300 degrees F. hot to –300 degrees cold. Meets standards of American Standards Association.

**Training Board** ..... **507**
Chase Bag Co. Folder describes a flannel presentation board with display pieces treated with fiber to instantly stick to board. Available in different models, including a portable type. Uses the principle of "fuzzy" materials adhering to each other.

# Index to Advertisers and their Agencies


Alan Wood Steel Co., *Arndt, Preston, Chapin, Lamb & Keen, Inc., Philadelphia* ..... 68
American Optical Co., *Sutherland-Abbott, Boston* ..... Inside Front Cover
American Safety Tank Co., *R. J. Potts-Calkins & Holden, Kansas City* 91
Ansul Chemical Co., *Kenyon & Eckhardt, Inc., Detroit* ..... 59

Bowman, Jr., Geo. H. ..... 77
Brady Co., W. H., *The Brady Co., Inc., Appleton* ..... 72
Breck Inc., John H., *Charles Sheldon, Inc., Springfield* ..... 64
Browne Mfg. Co., Inc., Stewart R. ..... 70
Buckley Corp., *Kenneth E. Hammond, New York* ..... 63

Central Safety Equipment Co., *Ralph A. Hart, Philadelphia* ..... 74
Chesebrough Mfg. Co., Cons'd., *Noyes & Sproul, Inc., New York* ..... 62
Chicago Eye Shield Co., *Reincke, Meyer & Finn, Chicago* Inside Back Cover
Chicago Hardware Foundry Co., *Wilson Advertising Service, Libertyville* 74
Coppus Engineering Corp., *James Thomas Chirurg Co., Boston* ..... 27
C-O-Two Fire Equipment Co., *Gray & Rogers, Philadelphia* ..... 54
Cover, H. S., *Jerry Bryant Advertising Agency, Chicago* ..... 47

Dolge Co., The C. B., *Caples Company, New York* ..... 80

Economy Engineering Co., *Kreicker & Meloan, Inc., Chicago* ..... 36

Federal Sign and Signal Corp., *Edgar Walter Fischer and Associates, Chicago* ..... 87
Fine Organics, Inc., *Kermin-Thall Agency, New York* ..... 49

Gets-A-Lite Company, *Read Brothers, Chicago* ..... 75
Granet Corp., The, *Meissner & Culver, Inc., Boston* ..... 75

Hild Floor Machine Co., *Cruttenden & Eger Associates, Chicago* ..... 81
Hillyard Chemical Co., *Phillips, Reick, Fardon, Kansas City* ..... 8
Hynson, Westcott & Dunning, Inc. ..... Back Cover

Kimball Safety Products Co., *Osborn Bartlett & Associates, Cleveland* 33

La Pierre-Sawyer Handle Co., *Brown Advertising Agency, Inc., Columbia* 92
Legge Co., Inc., Walter G., *J. M. Kesslinger & Associates, Newark* ..... 14
Lehigh Safety Shoe Co., *Frederick-Clinton Co., Inc., New York* .....10 & 11
Littell Machine Co., F. J., *Vernon S. Weiler, Chicago* ..... 82

Martindale Electric Co., *Kenneth H. Kolpien, Cleveland* ..... 72
Metal Arts Company, Inc., *Hutchins Advertising Co., Rochester* ..... 16

Mine Safety Appliances Co., *Ketchum, MacLeod & Grove, Inc., Pittsburgh* ..... 15
Multi-Clean Products Inc., *The Alfred Colle Co., Minneapolis* ..... 37

Oil-Dri Corp., of America, *Burlingame-Grossman, Chicago* ..... 34

Patent Scaffolding Co., Inc., The, *Glenn, Jordan, Stoetzel, Inc., Chicago* 12
Pac-Kit Co., The ..... 78
Pyrene Manufacturing Co., *Gray & Rogers, Philadelphia* ..... 54

Quabaug Rubber Co. ..... 19

Reece Wooden Sole Shoe Co. ..... 86
Ruemelin Mfg. Co., *Paulson-Gerlach & Associates, Inc., Milwaukee* .... 39

Safety Box Toe Co., *The Church Green Co., Boston* .....50 & 51
Safety Tower Ladder Co., *Walter DuBree Advertising Agency, Los Angeles* ..... 77
Sargent-Sowell, Inc. ..... 43
Scientific Industrial Supply Co. ..... 87
Scott Aviation Corp., *Melvin F. Hall Advertising Agency, Inc., Buffalo* 53
Searjeant Metal Products, Inc., *Kamb, Meteyer Advertising Agency, Rochester* ..... 93
Silicone Paper Co. of America, Inc., The, *Package Advertising Co., New York* ..... 5
Smith & Son, Inc., A., *John B. Ferguson, Jr., Philadelphia* ..... 92
Stonehouse Signs, Inc., *Walter DuBree Advertising Agency, Los Angeles* ..... 31
Surty Mfg. Co., Inc., The ..... 38

Tect, Inc. ..... 39
Tokheim Corporation, *Jones & Taylor and Associates, South Bend* .... 18

Wagner Sign Service, Inc., *Wendt Advertising Agency, Toledo* ..... 17
Watchemoket Optical Co., Inc., *Richard Thorndike Agency, Providence* .....2 & 3
Westinghouse Electric Corp., *Fuller & Smith & Ross, Inc., New York*... 20
Wilkins Co., Inc., The, *Laux Advertising, Inc., Ithaca* ..... 1
Williams Jewelry & Mfg. Co., *Vernon S. Weiler, Chicago* ..... 93
Willson Products, Inc., *Beaumont, Heller & Sperling, Inc., Reading* .... 6
Wyandotte Chemicals Corp., *Brooke, Smith, French & Dorrance, Inc., Detroit* ..... 13



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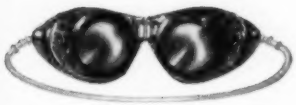

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491 Prospect Street

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**INDIANAPOLIS, IND.**
Averill Equipment Company
1917 North Goodlett

**KANSAS CITY, MO.**
Safety, Incorporated
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